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## Role of aromatic oils in pharmaceutical preparations

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### Abstract

Aromatic oils are highly active ingredients existing in natural sources like plants. Chemically they have various structures and hence properties. Pharmacologically they are utilized since time immemorial like as explained in classical ayurvedic texts like Arka Prakasham and others. Fragrant components of plants are volatile with steam and hence extracted by steam distillation and other reliable methods. A wide use of application they have had, like in medicine, perfumery and as flavouring agents. Here an attempt is done to visualize the ancient concepts in analogous to the modern pharmacological concepts.

**Keywords:** aromatic oils, arka prakasha, aroma therapy, bhaishajya kalpana

### Introduction

Fragrant components of plants are volatile with steam and hence extracted by steam distillation and other reliable methods. A wide use of application they have had, like in medicine, perfumery and flavouring agents. Most of them are seldom single compounds. They are terpenes or terpenoids. These odoriferous materials occurs in natural sources like plants. In India aromatic oils, the essential oils are referred as “Prana” and they are the soul of the plant in the West. Their synthesis create problem of variation in property and action. They are not a single substances but are combinations of individual units referred as terpenes/terpenoids. Here we use plant essences containing concentrated power of vital life of force. Synthetic variety lacks with life force and varies in property and dynamics.

They provides with aroma/aromatic (sweet) smell, hence the name aromatic oils. It is the vital part of recently flavoured branch, aroma therapy. India has a tradition of aromatic plant usage for beautification as well as for other purposes. Rich legacy can be seen here. They are organic substances found in nature. The properties like optical rotation may vary for synthetic variety.

In Arkaprakasam <sup>[1]</sup> a wide variety of their distillation and pre-distillation processes were mentioned. Therapeutic application and other pharmaceutical processes are also included. Most of them are with organic chemical structures of terpenes, sesquiterpenes, esters, alcohols, phenols, vitamins and aldehydes etc.

In Ayurvedic preparations like arishtas/asavas they produce flavour and smell on combination with self generated alcohols similar to esters. In oily preparations for arthritis, pain and edema, they provides muscles smoothening capacity, release rigidity to nerves and enhance peripheral circulation. Some of them provides with counter irritant action along with masking of foul smell in oily or fatty preparations. Their chemical composition is specific for desired action and hence standardization is compulsory. Family of plant kingdom is specific for their genuinity.

### Preservation

The potency will not remain stagnant if it is not properly preserved. Normal condition favours a period of three years of expiry after extraction. But on mixing with carrier oils this will be diminished to six months. Aromatic oils are sensitive to light and hence should be kept away from direct light. Amber colored bottles and storing in darkness are advisable. Temperature should be cautiously controlled or else will be vaporized.

### Standardisation

The schedule of marking under agmark is based on National Standards of Essential Oils. BIS insisted eighteen standards on essential oils. EOA (Essential Oil Association) Givandas index are early standards in India <sup>[2]</sup>. Methods of sampling and test for natural and synthetic perfumery materials are highly relevant in herbal or ayurvedic preparations. BIS has the distinction of being first natural standard body to prepare a well defined standard on methods

of testing (IS 326-1952) revised on 1968 as 'methods of sampling and test for natural and synthetic perfumery materials'. IS 2284-1988 method for olfactory assessment of natural and synthetic perfumery materials (1<sup>st</sup> revision) emphasized olfactory assessment of essential oils with paramount importance. Due to lack of other practical aids this practice was relevant for a long period.

Physio-chemical properties of aromatic oils may vary based on agro-climatic conditions. That is why Ayurveda emphasizes habitats of crude drugs. Nature of land, season, climatic conditions etc affect essential oils and hence is relevant.

For quality control, GLC method for synthetic and natural perfumery materials are subjected to gradings by the perfumery sectional committee. For wet method, If the assessment is based on one or more specific constituents, it is the apt method. Since the estimation of naturally occurring ingredients is in complementary with existing wet methods. This also has limitations. Estimation of aldehyde specifies for material of aromatic oil is also doubtful since individual variations are there.

*Cymbopogon flexuosus* was the variety which is abundantly used instead of *Cymbopogon citratus*. High citral content is the feature, solubility in 70% alcohol decreases on ageing due to myrcene (*Olefinic terpene*) which polymerises on exposure to light. That is why the quality varies. Oil of Eucalyptus from *Eucalyptus Globulus* contains cineole. Oil of turpentine was an essential item in pharmaceuticals. Alpha and Beta pinene are the ingredients. Cedar wood is an ingredient in ayurvedic preparation from which an oil is extracted. *Cedrus deodar* oil is used in medicines and perfumes. Oil of *Vetiver (Vetiveria zizanioides)* is from the root of the plant. It is a raw material for various ayurvedic preparations. Wild and cultivated varieties are there which can be detected by optical rotation. *Chandana* or *Santalum album* can be detected by Santalol which is present in it. It is an ingredient in various ayurvedic preparations for providing cooling effect. Standardization is essential for ensuring its role in medical and similar preparations. Clove oil, Cedar wood oil, sandal oil, Oil of ginger plays a vital role in preparations. Codes of practice for cultivation of aromatic plants are currently attempted ie regarding the origin and agronomic practices. Detection of adulterants in aromatic oils is a big task now.

### Production

From time immemorial distillation is the procedure among various methods. Steam distillation is the methodology by which oil of higher degree can be distilled off. But the non volatile fraction will not come in the stream and hence variation in the property will arise. Some of the ingredients may be lost in the process due to oxidation or hydrolysis [3]. Water distillation is the method for fine powder and flowers (Arkam). Steam is practically ineffective due to dissociation. Other distillation methods are there for exudates and balsams.

### Expression

Cold process is useful to remove the oil in an aqueous emulsion which can be separated by centrifuging. eg: Citrus oil is subjected to distillation due to the presence of non-volatile ingredients. With superficial or liquid CO<sub>2</sub> method, it includes advantages of both cold process along with non volatile compound. But expression in comparison with CO<sub>2</sub> extraction resembles essential oil close to oleoresin. Further processing like simple distillation is useful for concentrating.

In Arka kalpana and also in extraction of volatile herbal ingredients this is useful like oil of cassia or twak (*Cinnamomum zeylanicum*). In peppermint oil this is useful for removing impurities like iron.

Rectification to remove substandard part of Terpene hydrocarbons from oil is by process like vacuum distillation. By this the therapeutic property along with salient features can be improved. Quality of pharmaceutical products like arkam, arishta and asava depends on the aromatic oils. Extraction with hydroalcoholic mixtures preserve natural flavour of the material like in arishtasava and arkam. In soft drinks and panakam it is adopted.

Oil quality is used for detecting the adulteration in raw drug and products. Olden standards are now not practical since physical and chemical characters are easily be altered to meet specification. GC is the practical method and physical examination with nose is also important to detect the foreign material. Deterioration may be due to polymerization, oxidation and hydrolysis during ageing which is crucial in arka kalpana. It can be controlled by storing in dry state in full airtight containers away from sunlight.

### Discussion

In Ayurvedic pharmaceuticals like arkam, arishtas and asavams they have crucial roles in organoleptic and pharmacological properties. They enrich the appeal and action by suitable methodologies, the flavour is enriched by adding natural identical raw material also. Ethyl butyrate and cis-3-hexenal is used in orange peel oil. Availability, concentration, stability are the problems of essential oil in pure and compound forms. Similar materials are used due to unavailability, price, concentration, thermal stability and variability. Corriander oil contains Linalol which is a core ingredient in apricot and hence being mixed. Essential oil contains other factors which affect positively and negatively and hence isolated fractions are used. Eugenol from clove leaf is engaged universally in banana flavor.

The sources of Cassia oil (*Cinnamomum cassia*) are leaves, twigs and interior bark, 0.3% oil can be taken by water distillation. Its chemical combination is a crucial factor in ayurvedic preparations instead of *Cinnamomum zeylanicum*. Cassia is otherwise called as poor man cinnamon. *Cinnamomum zeylanicum* is an ingredient in Chathur jadam which is a common flavoring agent in arishta/asava and avaleha kalpana. Cinnamon leaf oil and Cinnamon bark oil contains eugenol, caryophyllene, cinnamaldehyde and linamol along with cinamal acetate. Cinnamon leaf oil is a blending oil in clove oil. Eugenol, Caryophyllene, Eugenol acetate etc are the ingredients of clove oil which varies in proportion. Finest odour is for bud oil. Bud oil is the apt variety and is adulterated with other varieties and is detected by GC.

*Coriandrum sativum* with coriander oil on steam distillation contains linalol, gama-terpinene, camphor, alphapinene, paracymene, limonene, genarenyl acetate. Seed oil is adulterated with synthetic Linalol which can be detected by GC. Traditionally it is used as flavouring agent for alcoholic drinks. In cooking purpose for meat and curry blends. There is no legal restriction for its usage.

*Allium sativum*, a common Ayurvedic raw material is a source of various essential oils. The bulb yields 0.1% of oil on steam distillation. The major ingredients are diallyl disulphide, diallyl trisulphide, diallylsulphide. Adulterant in natural identical material is detected by gas chromatography. *Zingiber officinale* is the source of the ginger oil. It is a

widely used raw material in Ayurvedic preparations like kwatham, gastro intestinal preparations for appetite, anti flatulent, digestives etc. 2% oil is obtained by steam distillation. The contents varies with habitat especially geraniol.

Grape fruit oil is different from orange oil. The marker compound is nootkitone. It is prone to oxidation on standing. Adulteration with orange terpenes are detected by GC.

Lemon oil from citrus lemon is majorly from the peels, by cold pressing. Oil content varies with ecologic conditions. Ingredients are limonene, betapinene, alpha terpinene, geraniol, neral, neryl acetate, geranyl acetate in feeble percentage along with citronellal, linalool and nonanul. Lemon grass oil is extracted from cymbagonam citrates. Oil is obtained by steam distillation. Major constituents are geraniol, neral, geranyl acetate and lemonin. The other ingredients are caryophyllene, 6-methyl-hept-5-en-2-one, linalool, citronellal etc. It is the natural source of citral. Adulteration with synthetic citral can be detected by GC.

Myristica fragrans (nutmeg) is the source which yields oil by steam distillation. Mace (Jaatipatri) yields oil also. Constituents are sabinenl, alpha pinene along with beta pinene, myrsticine, gama terpene, myrecene, linanone, 1, 8 cineole and saferole. It is used in soft drinks, bakery products etc.

Star anesoile is obtained from illicium verum. Major constituents are transanethole, lenonine, along with anise aldehyde, linalole, and methyl chavicole. It is adulterated with anethole and can be detected by GC. It is used in food and various Ayurvedic medical preparations.

### Conclusion

Aromatic oils are used singly or as compound formulations or their derivatives either in the field of medicine or for flavouring. Apart from this, they are a crucial factor in emphasizing the genuinity of raw materials and products. In Ayurvedic preparation especially, fermented preparations (arishtam, asavam), they provide esterification and hence taste and flavour. Semi solid preparation like avaleham, choornametc they have specific roles, both medical and flavouring purpose. Adulterants can cause problems wheras their extraction from raw material also create problem in Ayurvedic preparation.

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