IJNRD.ORG ISSN : 2456-4184
INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG
An International Open Access, Peer-reviewed, Refereed Journal

INNOVATIVE FORMULATION AND PACKAGING OF MEDICATED AROMA INHALERS USING ROSE OIL

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ABSTRACT

There is a need for specialized aroma inhalers that may support improved physical, mental, and spiritual health because the vaporizers used in current inhalers only have a localized effect. Aroma inhalers enhance mental and emotional health by using aromatic essential oils. This idea makes use of the holistic wellbeing-based aromatherapy principle to address related issues. Since there are many infectious outbreaks these days, we must boost our immune systems and manage various infectious outbreaks. A medicated aroma-inhaler may be of assistance in this area as well as for treating infections. Aromatherapy uses natural organic extracts derived from natural sources to improve health and well-being. We use a variety of ingredients in this formulation, including rose oil, camphor, pudina crystals, and methyl salicylate.

KEYWORD

Aromatherapy, Immune support, Medicinal Inhalation, Natural Extracts.

Index terms: *Introduction, Essential oil, Extraction, Formulation, Future Prospective, Conclusion, References*

1. INTRODUCTION

Natural plant extracts are used in aromatherapy, an all-encompassing healing method, to enhance well-being and health. It's sometimes referred to as essential oil therapy. Aromatherapy helps one's psychological, spiritual, and physical health through the use of pleasant essential oils medicinally. It improves mental and physical well-being. Aromatherapy is regarded as a science as much as an art. In recent years, science and medicine have begun to endorse aromatherapy more and more. Aromatherapy has been utilized by human beings for thousands of generations. Aromatic substances derived from plants were utilized by ancient cultures in China, India, Egypt, and other regions to make oils, balms, and resins. These natural products were employed in medicine and religion. They were believed to provide both psychological and physical benefits. The distillation of essential oils dates back to the Persians in the tenth century, while the technique may have been used for several centuries before then. German publications on essential oil distillation date back to the 16th century. The curative efficacy of essential oils was discovered by French medics in the 1800s. The nineteenth century saw a rise in the prominence of medical professionals who concentrated on the use of chemical medications. Nonetheless, the German and French physicians acknowledged the role.

1.1AROMATHERAPY: Through the therapeutic application of concentrated essential oils extracted from various plant parts using techniques like steam distillation or expression, aromatherapy is a complementary therapy that promotes overall well-being. These highly concentrated oils are made from materials such as bark, flowers, leaves, and resins. They are diluted in fixed oils and used in contact therapy. Moreover, they can be breathed in through room diffusion, nasal sticks, or infused cloths. Dilution is necessary for citrus oils to avoid phototoxicity and skin irritation. Plant oils were first used in perfumery and rituals in ancient Egypt, and the principles of holistic medicine were established by Hippocrates and Galen in ancient Greece. Aromatherapy is consistent with Traditional Chinese

Medicine and Ayurvedic medicine's holistic approaches. These long-known essential oils can be consumed or applied topically. [1][2]

Some of the types of aroma therapy are:

1. Inhalational / Olfactory Aromatherapy
2. Topical Body Massage Aromatherapy
3. Cosmetic Aromatherapy

2. INHALATIONAL AROMA THERAPY ON MOOD DISORDER ROSE OIL Aromatherapy used through inhalation affects mood and psychological health by stimulating olfactory receptors that send signals to the limbic nervous system, which release dopamine and serotonin, among other neurotransmitters. Rose oil has been used historically in many cultures, especially *Rosa Damascena Mill*. (Damask rose), which has anti-inflammatory, antiseptic, anti-anxiety, and anti-depressant qualities. Research indicates that it may boost libido and reduce depressive symptoms by secreting dopamine. There is little scientific support for the widespread use of aromatherapy to reduce anxiety in preoperative situations. Convenient and safe, inhalational aromatherapy has been shown to help with pain, nausea, vomiting, insomnia, and respiratory infections. Research on how it affects cancer patients' symptom management has shown promising results. It is advised to mix rose oil with a carrier oil before administering it. [1][2][3]

2.1 ADVERSE DRUG REACTION: Adverse drug reactions (ADRs) are defined by the WHO as unwanted, noxious reactions to medications at therapeutic dosages. The route of administration, particularly the gastrointestinal and parental routes, is a major contributor to adverse drug reactions (ADRs). Inhalational routes, which use nasal or brain (olfactory) targeted drug delivery systems, are preferred to reduce adverse drug reactions (ADRs). Intranasal sprays in particular are preferred as medicated inhalers because they have few side effects. Patch tests and essential oil dilution can help allay concerns about burning and irritation when applying essential oils topically. Although breathing in the fumes of essential oils can cause allergic reactions in certain asthmatics, the natural ingredients in aromatic inhalers reduce this risk.[17][18]

2.2 BRAIN-TARGETED NASAL DELIVERY SYSTEM: Since the blood-brain barrier (BBB) prevents therapeutic drugs from entering the brain, attempts to get around it and target the brain directly through the trigeminal and olfactory nerve pathways have grown. Benefits of the intranasal route include improved site specificity, direct brain delivery, and avoidance of systemic side effects. Current drug delivery methods address issues like mucociliary clearance, enzymatic breakdown, and nasal cavity structure. These methods include nanotechnological approaches like liposomes and nano-emulsions. By stimulating the olfactory system through inhalation, aromatic plant extracts can transport medicinal medications directly to the nervous system. Without damaging the nasal mucosa or other tissues, these medications that affect neurotransmitters may be able to reduce anxiety and depressive symptoms as well as enhance the quality of sleep. Route for the absorption from nose to brain. The upper respiratory cavity's olfactory epithelial cell layer is the target area for efficient nose-to-brain drug delivery. Olfactory nerve cells in this area have direct access to the brain and CSF, avoiding the BBB in the process. Straight lines represent nose-to-brain transport, while lines that are dotted represent clearance. Transport via the perivascular pump, bulk flow, lymphatic drainage, and endo-neural transport via the trigeminal and olfactory nerves are depicted in the box. Vascular endothelium permeability serves as the primary barrier to the entry of small amounts of intranasally administered medication into the central nervous system (CNS) through carotid artery branches. There is little systemic absorption via the nasal mucosa.[11][12][3]

3. ESSENTIAL OIL

Essential oils are derived from a variety of plant parts, including stems, flowers, and seeds. They are hydrophobic substances containing volatile plant-based compounds. They are also referred to as volatile or ethereal oils and are widely used in foods, cosmetics, and pharmaceuticals due to their odorous, flavorful, and therapeutic properties. These oils have a variety of uses, including antimicrobial, antipsychotic, insecticide, and sedative substitutes. While the Romans extensively used oils in massages and baths, historical records show that Egyptians began using them for cosmetics and scented oils as early as 4500 BCE. Doctors spread medical literature, including works by Hippocrates and Galen, as the Roman Empire collapsed, influencing many languages in the process. [7][8][9]

3.1 ROSE OIL: The *Rosaceae* family which is best known for roses, includes many commonly used medicinal plants that are native to Iran or the Persian Gulf. Rose oil, which is made from the petals of *Rosa Damascena* and *Rosa centifolia*, originated in Greece and was brought to the Indian subcontinent by the Mughals. These days, Morocco, Turkey, and Bulgaria are the main producers of this pricey, semisolid, pale yellow oil. Its primary components are glycosides, terpenes, anthocyanins, and flavonoids. 95 components were found in an Iranian study on *Rosa damascene*, with β-citronellol and nonadecane being the most common. Rose oil has long been used in Persian medicine, which attributes its anti-inflammatory, anti-infective, and wound-healing qualities to treating inflammatory gastrointestinal disorders, headaches, hemorrhoids, and muscular pain.[3][4]

4. EXTRACTION METHODS OF ESSENTIAL OIL

4.1 Hydro distillation: Avicenna is credited with discovering the earliest and most fundamental technique for extracting oil: hydro distillation. By submerging the plant materials directly in the water within the pot and then steaming the mixture, the process of hydro distillation is used to extract essential plant oils. The apparatus consists of an Alembic vessel, a heating source, a condenser for turning vapor into liquid, and a decanter for gathering condensation and separating essential oils from water. This unique method of extraction is used frequently for extractions that call for natural plant material that is hydrophobic and has a high boiling point, such as wood or flowers. This method enables the controlled extraction of essential oils due to the oils are submerged in water.

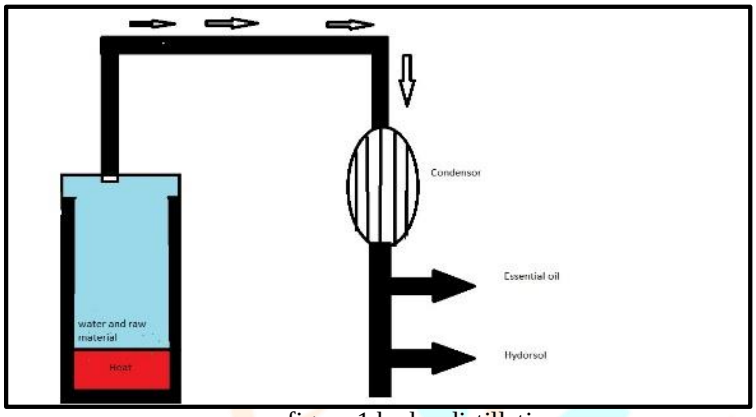

fig.no.1 hydro distillation

4.2 Soxhlet Extraction: Fat extraction has been the main application for soxhlet extraction, a well-established technique for removing physiologically active compounds from plants. Its use is restricted even though it has been used historically. It is currently used as a standard by which to compare novel extraction techniques. Using this method, an organic solvent is added to a distillation flask along with a dried sample in a thimble. The solution is siphoned off into a different flask when it overflows.[22]

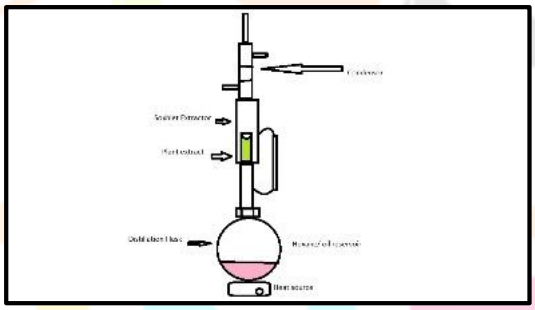

fig.no.2 soxhlet distillation

4.3 Cold Expression: By expeller-pressing oil at low temperatures and pressures, the cold expression method guarantees that the finished product is 100% pure and maintains the characteristics of the plant. This method of mechanical extraction, which uses plants, flowers, seeds, and citrus oils, reduces heat. After scrubbing off the outer layer that contains oil, the entire plant is crushed to release the oil from the pulp and vesicles. The essential oil rises to the surface of the mixture after being separated from it by centrifugation.[22]

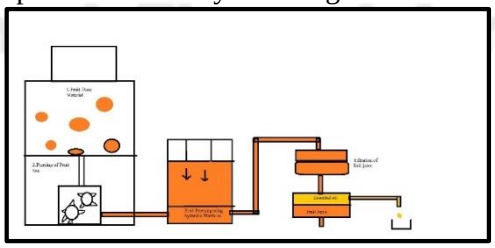

fig.no.3 cold expression

4.4 STEAM DISTILLATION: Since ancient times, steam distillation has been the most widely used and accepted extraction technique. It works with the majority of oil-bearing plants and is the most effective, simple, and safest way to produce high-quality essential oils. This distillation method calls for a large amount of plant material to be placed in a steam boiler and is usually not carried out at temperatures higher than 100 degrees Celsius. Steam travels through the plant material during the steam distillation process, carrying the volatile essential oil compounds through a tube before cooling in a condenser. In this stage, water vapor sinks to the bottom to be collected, and an oil layer rises to the top.[21]

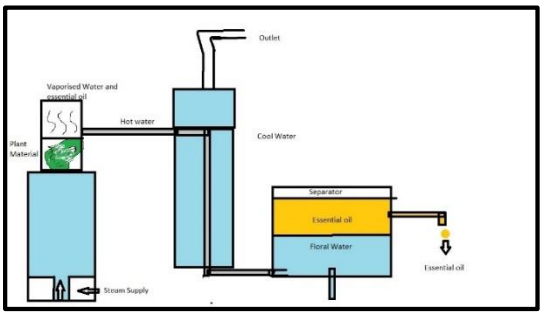

fig.no.4 steam distillation

4.5 **SUPERCRITICAL FLUID EXTRACTION:** By increasing temperature and pressure above critical values, supercritical fluid (SF) is produced, which dissolves the liquid-gas barrier. SF is distinct from liquids and gases due to its special qualities, such as its ability to modulate density in response to changes in pressure and temperature. Supercritical CO2 is the most commonly used gas for supercritical fluid extraction (SFE) because of its low critical temperature, low critical pressure, affordability, and safety. SFE has the advantages of a high extraction yield, quick processing, and environmental friendliness when it comes to effectively removing particular components from multicomponent mixtures. It works particularly well for removing essential oils from heat-sensitive materials. SFE also helps with solvent recovery.[15][19]

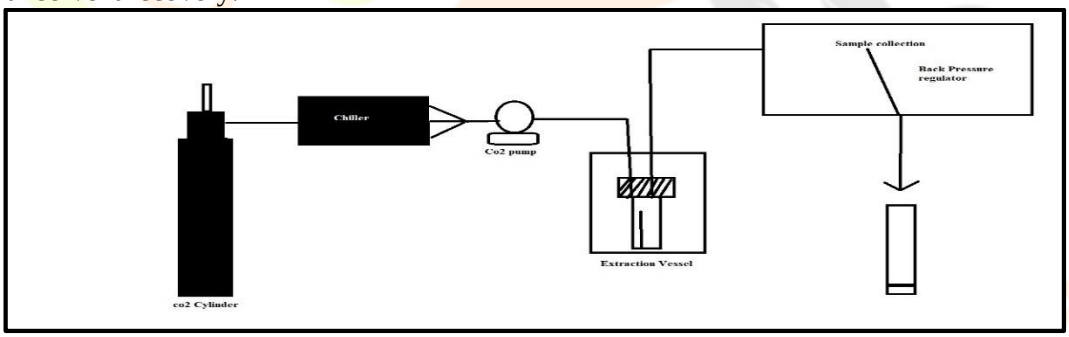

fig.no.5 supercritical fluid extraction

4.6 ENFLURGE METHOD: Enfleurage is not commonly used today, but it is one of the oldest methods of essential oil extraction that implements the use of fat. By the end of this process, either vegetable fat or animal fat becomes infused with the flower's fragrance compounds. The fats that are used are odorless and solid at room temperature. The enfleurage process can be done either "hot" or "cold." In both instances, the fat that is saturated with fragrance is called "enfleurage pomade.[21]

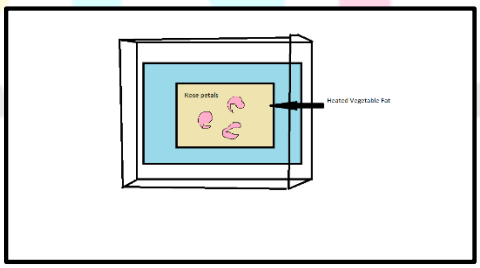

fig.no.6 enflurage method

5. FORMULATION AROMATIC INHALER

5.1 Master Formula:

table1. formulation of rose oil inhaler

Sr. No.	Ingredients	Uses
1.	Pudina Crystals	Irritation Relief
2.	Camphor	Cold Sore
3.	Eucalyptus Oil	Nasal Decongestant
4.	Methyl Salicylate	Minor Aches
5.	Rose Oil	Anti-Inflammatory

Procedure:

- Weigh each item by the formula.
- Place the rose oil, camphor, and pudina in a beaker.
- Gradually warm the mixture and add Pudina Crystals and Bhimsun camphor, stir it.
- After letting it cool, slowly pour it onto a cotton roll.
- Cap the cotton in the container and let the solution slowly run down a cotton roll.

6. CHEMICAL COMPOSITION OF ROSE OIL:

Terpene alcohols are present in considerable amounts in its oil, with citronellol being the most common, followed by geraniol, nerol, and linalool. The ratio of them is another important factor. Superior-quality oils can be identified by their ratios of citronellol to geraniol. There are a few sulfur-containing components found in the primary hydrocarbons. Our examination of the entire composition of *Rosa Damascena* oil fully conforms with the requirements stated. Recognized as: PHENYLETHYL ACID The main source of the unique natural "rose" scent is Ylang Ylang, Geranium, and Neroli essential oils, which naturally release a heady and alluring "wild rose" scent.[16]

1. Citronelol 2. Geraniol 3. Nerol 4. Phenylethyl alcohol 5. Ethylene Urea 6. Eugenol 7. Ethanol 8. Linalool 9. Paraffins (C17, C19, C20, C21, and C23) [24][25]

7. Applications of rose essential oil:

1. **USES IN COSMETIC INDUSTRY**: Since ancient times, pure rose essential oil has been a mainstay in cosmetics, known for keeping skin looking young. Its antioxidant-rich blend, which includes citronellol and geraniol, fights free radicals and delays the aging process. Rose oil is especially helpful for mature, dry, and sensitive skin types. It also improves natural radiance, heals scars, rosacea, and eczema, and draws impurities out of the skin. Rose oil has a pleasant scent, but its main use in high-end cosmetics is to stimulate collagen to reduce wrinkles and give the appearance of younger skin. Rose oil is used in serums and creams for skin renewal, as well as in cosmetics like soaps, moisturizers, and aroma oils. To support healthy hair, rose oil is also frequently found in hair care products. Its usage in perfumery dates back to the Persian Empire.

2. **PHARMACOLOGICAL APPLICATION**: Balances Hormone Production: Rose oil, sometimes referred to as the "feminine oil," is said to have the ability to help balance hormones and lessen the symptoms of these imbalances on the skin. This makes it a fantastic product to use when your skin needs some TLC and is experiencing monthly issues.[20] **Enhances skin blood circulation**: Rose oil promotes overall skin health by increasing nutrient absorption and improving skin permeability. Its inclusion in skincare products helps to improve blood circulation and leave skin smoother, and more radiant. Rose essential oil is also an important part of aromatherapy and has a useful pharmacological application. Pure rose oil is an essential choice for skincare because of its deep-penetrating qualities. This highlights the significance of choosing products with natural, non-toxic ingredients for the best results.

Wound healing: When applied several times a day, rose oil speeds up the healing of wounds. Its anti-inflammatory qualities are useful for treating a variety of skin conditions in both pharmaceutical and cosmetic applications.

8. Evaluation of essential oil:

To help consumers make educated decisions about massage, aromatherapy, or therapeutic use, an evaluation of *Rosa Damascena* and *Rosa Rubiginosa* plant extracts focuses on the essential oil's purity, the extraction method, the authenticity of the fragrance, and the user experience. In this review, the goal is to determine the purity of the

compound by using techniques like liquid and gas chromatography. The thorough analysis combines data from several sources to produce an informed evaluation.

8.1 METHODS FOR THE EVALUATIONS: By locating, examining, and compiling a number of unique documents, reviews, and other materials on methods for Essential oil authenticity from various sources, including Science Direct, Research Gate, and Google Scholar. Various method including

- Gas Chromatography
- Liquid chromatography

8.1.1 LIQUID CHROMATOGRAPHY MASS SPECTROSCOPY: LC–MS enhances chemical analysis by combining the separation capabilities of liquid chromatography with the mass analysis capabilities of mass spectrometry. A pump, column, and detector are used in high-performance liquid chromatography (HPLC) to separate and analyze components according to their interactions with the stationary phase and retention time. Compared to standard column chromatography, HPLC's higher pressure which results from smaller particle sizes—allows for better separation on shorter columns. This method, which provides spectral information for identifying components within mixtures, is essential to chemical analysis.[29]

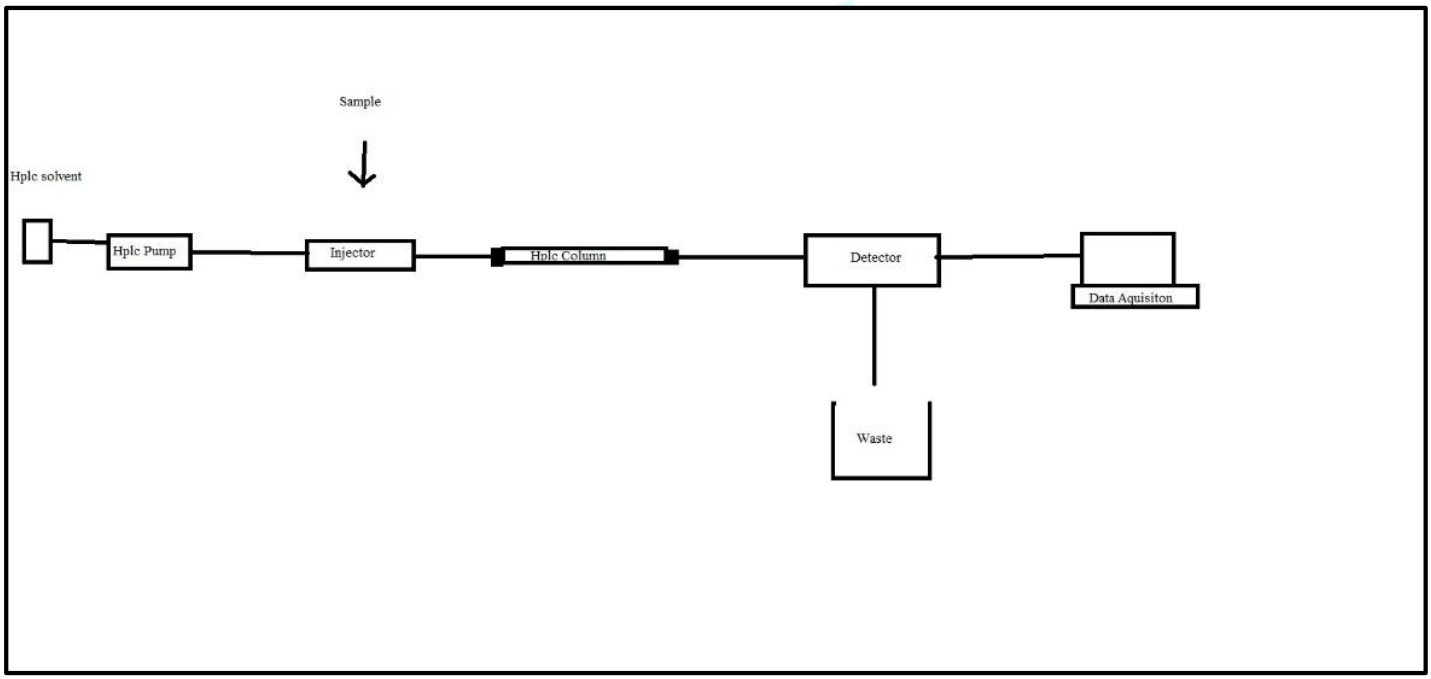

fig.no.11 high-pressure liquid chromatography

FUTURE PROSPECTIVE

Future research on aroma inhalers could improve their effectiveness in several areas related to well-being. Improvements could be made in the areas of increasing immunity, treating migraines and headaches, and reducing agitation and stress. Future aroma inhalers will incorporate a variety of aromatic essential oils and innovative formulations to offer a comprehensive approach to health.

CONCLUSION

The development of aroma inhalers includes the fusion of vapor inhalers with aromatherapy, which presents a fresh method to augment their efficacy. This invention aims to create a flexible and effective product for enhanced well-being by fusing the holistic principles of aromatherapy with the localized delivery of vaporizers.

ACKNOWLEDGEMENT:

I take this privilege and pleasure to acknowledge the contribution of many individuals who have been inspirational and supportive throughout my work and endowed me with great pleasure and a profound sense of gratitude, I would want to thank my esteemed mentor, **Professor Kshitij Varma**, from the bottom of my heart, Department of Medical Chemistry for his constructive guidance.

I want to convey my profound appreciation to **Dr. R. S. Bhambar**, Principle, MGV's Pharmacy College, Panchavati, Nashik for providing the necessary facilities, I want to express my sincere gratitude to all my group members without their support and coordination we would not have been able to complete this project.
I want to draw particular attention to my parents and friends for supporting me in every step of my life.
I acknowledge with thanks, the valuable suggestions, criticism, and cooperation from colleagues.

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