

Comparative Studies on Extraction of Essential Oils from Different Medicinal Plants.

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Abstract:

Medicinal plants are considerable significance due to their special attributes. The large number of phytochemicals present may lead to the development of novel drugs. The extraction of medicinal plants with traditional methods plays an important role in the extraction outcomes. Essential oils extracted from flowers and leaves are the mixture of chemical constituents which contains less molecular weight compounds as alcohols, polyphenols, terphenols, aliphatic and carbonyl compounds, which possess various biological properties. Here in this study, a very simple method as hydrodistillation and steam distillation for extraction of oil is adopted and compared for evaluation of their properties and extraction outcomes.

Keywords: Medicinal plants, Hydrodistillation, Extraction, Essential oil.

1. INTRODUCTION:

As a traditional medicinal herb and valuable natural spice, essential oil has many significant effect [1-4]. Interest in utilizing natural sources in the development and formulation of skin products, as an alternative to conventional drugs and synthetic products, contribute to increase interest in research and industrial application of medicinal plants. High content of phenolic and flavonoids in medicinal plants have been associated with their antioxidant activities that play a role in the prevention of the development of age-related disease, particularly cause by oxidative stress. With regards to the beneficial phytochemicals in medicinal plants and the shift towards natural products in pharmaceuticals and cosmetic industry, the research on medicinal plants particularly are as important as the research on conventional drugs. The study of medicinal plants starts with the extraction procedures, which is an important step in the processing of the bioactive constituents from plant materials.

Conventionally, the essential oil is taken from plant raw material by different extraction methods [5,6] including solvent extraction and steam distillation. However these methods have drawbacks such as loss of volatile compounds, low yield and accrue of toxic solvent residues [7,8]. Essential oils are lipophilic and soluble in organic solvents due to their hydrophobic nature and lower density than water. In this study, the selected plants essential oil has various applications. As a part of our investigation on evaluation of aromatic medicinal plants. The aim of this work is to provide comparative record of analysis on essential oils of Geranium, Eucalyptus and Lantana Camara.

2. MATERIALS AND METHODS:

2.1. Preparation of Plants:

The fresh, green fleshy leaves of Geranium, Eucalyptus and Lantana Camara were collected from local area and A. S. C. College campus, Indapur. Collected leaves were washed with distilled water to remove dirt and dust and dried in shade for 1 hour, chopped into fine pieces and was used for further study.

2.2. Extraction of oil by Hydrodistillation method:

Hydrodistillation is an advanced method for extracting essential oils from plants because of its ability to maintain the original quality of plants. The fresh leaves of each plant about 250 g was taken in 500 ml round bottom flask and added with 250 ml of solvent (distilled water). The reaction was heated at 100 °C for about 2 hours. The distillate was collected in conical flask. Shown in fig. 1(9-12). After completion of distillation, essential oil was separated by using separated funnel and rotavapours. The collected essential oils (from different plants) were collected and stored in dark glass bottles and stored at 4 °C. The infusion will be stronger for six months to 1 year.

2.3. Extraction of oil by Autoclave method:

Autoclave method is used for large scale extraction of oils. The autoclave containing water is arranged in such a way to remove the steam from it using copper pipes at the top. The ratio of solvent and plant material was kept same for all plants (7 kg plant material : 5000 ml solvent) at 100 °C for 2 hours. The pressure of steam was reduced by adjusting knob and condensed by passing through circular copper tubular coil dipped in ice cold water can. The distillate was collected through pipes which was fitted at the base.

In this procedure, two distinct phases were obtained: an organic phase (EO: essential oil) and an aqueous phase containing a part of the essential oil. The organic phase was separated from the aqueous phase by shaking it with 10 ml hexane (solvent) and separated by separating funnel and finally on rotavapour (13). The essential oils were collected and labelled in air tight glass bottles and stored at 4 °C.

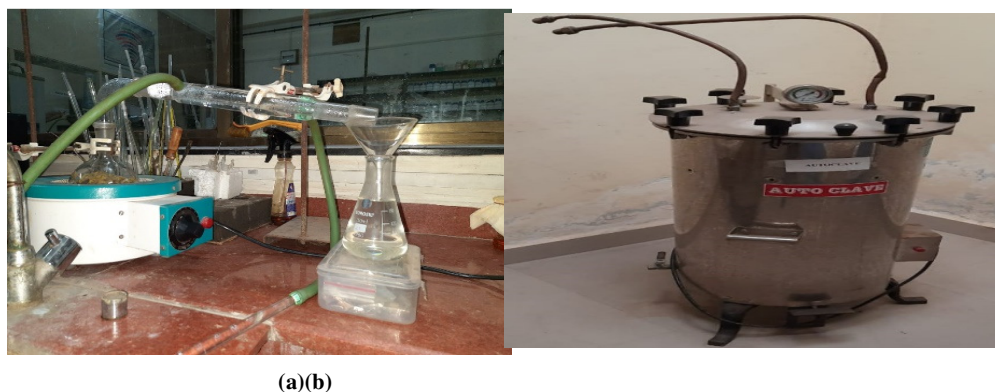


Figure 1. Extraction of oil by (a) Hydrodistillation and (b) Autoclave method.

Table 1. Botanical Classification of plants

Particulars	Geranium	Eucalyptus	Lantana Camara
Kingdom	Plantae	Plantae	Plantae Plantae
Class	Magnoliophyta	Monocotyledons	Magnoliopsida
Sub class	Rosidae	Rosidae	Rosidae
Order	Geraniales	Myrtales	Lamiales
Family	Geraniaceae	Myrtaceae	Verbenaceae
Genus	Geranium;L	Eucalyptus;L	Lantana
Species	Perennials	E-glodulus	L. Camara

Plant taxonomy or classification is the science of naming organisms and placing them in a hierarchical structure, each level being given a name (e.g., kingdom, division (phylum), class, order, family, genus, species).



Figure 2. Fresh leaves of (a) Geranium (b) Lantana Camara and (c) Eucalyptus and Essential oils extracted from (d) Geranium, (e) Eucalyptus and (f) Lantana Camara

3. RESULT AND DISCUSSION:

The medicinal plants used for extraction and their extracted oils were as shown in Figure 2. Similarly the quantity of oil collected from various plants were shown in table 2 and 3. Comparative data in table indicates that slightly dry leaves are found to be more effective than fresh leaves. Maximum quantity of essential oil was collected for Lantana camara. Also the oil collected by Autoclave method gave maximum quantity of oil for Lantana camara (slightly dry leaves) of 47.5 ml. In autoclave method, extraction rate and the yield of essential oil compounds increased with increasing of processing pressure and processing time while the addition of water in the leaves before extraction decreased the responses (14). All the medicinal plants have various medicinal properties such as antibacterial, antioxidant, anti-inflammation, astringent (15-18). Essential oils of all medicinal plants used to treat health condition (for centuries) such as anxiety, depression, infection, pain, asthma, nasal congestion, skin ulcers, headaches, fever, dry and cold cough, toothache and so on.

Table 2. Quantity of oil collected by Hydrodistillation method

Sr.No.	Name of Medicinal Plants	Quantity of leaves taken in gm	Quantity of water taken in ml	Quantity oil collected in ml
1	Geranium Leaves (Fresh)	250	250	4.0
2	Geranium leaves (slightly dry)	250	250	4.5
3	Eucalyptus leaves (Fresh)	250	250	3.0
4	Eucalyptus leaves (slightly dry)	250	250	3.5
5	Lantana Camera leaves (Fresh)	250	250	5.0
6	Lantana Camera leaves (slightly dry)	250	250	6.5

Table 3. Quantity of oil collected by Autoclave method

Sr.No.	Name of Medicinal Plants	Quantity of leaves taken in Kg	Quantity of water taken in litre	Quantity of oil collected in ml
1	Geranium Leaves (Fresh)	7.0	5.0	42.0
2	Geranium leaves (slightly dry)	7.0	5.0	43.5
3	Eucalyptus leaves (Fresh)	7.0	5.0	30.0
4	Eucalyptus leaves (slightly dry)	7.0	5.0	31.5
5	Lantana Camera leaves (Fresh)	7.0	5.0	45.0
6	Lantana Camera leaves (slightly dry)	7.0	5.0	47.5

4.CONCLUSION:

This study gives a very simple, convenient method for the extraction of essential oils. The oils from four different medicinal plants were extracted quantitatively by using conventional hydro distillation and autoclave methods. The oils extracted from fresh leaves were less in quantity than slightly moist leaves this is because of dry plant material gives free bonding of solvents with the phytochemicals according to its polarity. The collected oils were compared and it was shown that maximum oil was extracted from slightly dry leaves than fresh leaves. The aqueous extract of Eucalyptus and Lantana camara in various proportions were found to be effective against the pomegranate fungi diseases like Telya (Bacterial Blight), Dambrya (black heart) and Karpa (manifests on leaves as small spots). This study has proven that by Autoclave method large quantity of essential oils were collected. Lantana camara leaves shown to be yield large quantity of oil by both methods.

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