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Original Research Article

Laboratory Scale Oil Extraction and Perfume Formulation from Locally Available Lemongrass Leaves

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ABSTRACT

Distillation based recovery processes such as steam and vacuum distillation are preferred for the extraction of essential oils from plant materials. Other methods include solvent extraction, expression or enfleurage. In the present work, three methods are used for oil extraction namely solvent extraction, hydro distillation and enfleurage. By using solvent extraction, 2.9 grams of essential oil per 140 grams of dry lemongrass sample. This gives about 2.07% yield of essential oil. By enfleurage method, 2.74 grams of essential oil per 140 grams of dry lemongrass sample was obtained. This amounts to 1.957% oil yield. 1.325 grams oil per 140 grams of lemongrass sample was obtained by hydro distillation process, i.e. 0.946% yield of oil.

Key words: Extraction, distillation, yield, essential oil, solvent.

INTRODUCTION

Extracts of biologically active components isolated from plant species finds numerous applications in perfume, aroma and pharmaceutical industries. Many plant extracts are very important from therapeutical perspectives. Perfume industries are growing in demand as the living standards are improving day by day. There is increasing demand for perfumes. They mask the body odor. They give pleasant feeling and increases enthusiasm to perform better at workplaces. A perfume is composed of three notes, namely base note, middle note and top note. Smell of fragrance after drying is referred as base note. Mixing of perfume with unique body chemistry forms middle note. The first smell experienced in an aroma is top note. Plant and animal substances ate traditionally used for perfume formation. [1,2] Essential oils, pure grain oil and water are three key ingredients in relation to perfume. [3-5] The main objective of this research is to extract and formulate perfume from Lemon grass (CYMBOPOGON FLEXUOSUS). The investigation focuses on the production of perfumes from natural, plant sources as against synthetic chemicals. It will reduce any side effect resulting from synthetic chemicals.

LITERATURE REVIEW ON PAST WORK

Lemon Grass (Cymbopogon Spp.) was steam distilled by Amenaghawon et.al to study modeling the Kinetics. [6] They found that extraction was not instantaneous. They also observed that the yield can be improved by using loose packing of the plant material within the steam distillation equipment. Oloyede carried out an investigation aimed at studying chemical composition and antibacterial activity of aqueous extract of Cymbopogon citratus leaves. [7] According to him, Cymbopogon citratus leaves could be considered safe and good as a therapeutic agent. Ain et.al used lemongrass (Cymbopogon citratus) oleoresin in pressurized liquid extraction (PLE). [8] They found optimized operating conditions as 167°C, a pressure of 1203 psi and a static time of 20.43 min.

Ranitha et.al used two methods, viz. microwave-assisted hydro-distillation (MAHD) and conventional hydro distillation (HD) for extraction of Lemongrass (Cymbopogon Citratus)

essential oil. [9] According to the MAHD method provided a better alternative. A review on chemical analysis and therapeutic uses of citronella oil from cymbopogon winterianus was carried out by Wany et.al. According to this review there are several possible varieties of Citronella which consistently gave oils of composition different to either Ceylon type or Java type. [10] This review provided an insight into chemical composition and the extent to which the main constituents varies in proportion. Tajidin et.al investigated the effects of three maturity stages at harvest of lemongrass on essential oil, chemical composition and citral contents. [11] They observed that maturity stage at harvest is influenced essential oil and citral contents. According to these studies, it is important to harvest at the appropriate level of maturity in order to achieve high quality essential oil. Singh et.al extracted essential oil of lemongrass by microwave-assisted hydro distillation (MAHD) and solvent free microwave extraction (SFME) method. [12] They also studied effects of various parameters like microwave power, irradiation time and sample particle size. They observed an increase in oil yield with increasing microwave power, irradiation time and decreasing particle size.

MATERIAL AND METHOD

In the present investigation, three methods, namely hydro-distillation, solvent extraction, and enfleurage, are used for extraction of oil.

Hydro distillation

500 ml of distilled water and 140 gram of fresh lemongrass sample were placed into a round bottom flask. As shown in fig.1, the flask was fitted with a rubber stopper and connected to a condenser and heated. Water was allowed to flow counter currently through the condenser. After reaching appropriate temperature, the essential oil, mixed with the water vapor was extracted from the leaves. The oil-water overhead product was passed through the condenser. The vapours were condensed and hence separated. Volatilization was avoided by cooling with ice cubes. The condensate was collected using a beaker. It was then separated by a separating funnel. The oil was immediately collected into a stoppered bottle and closed tightly.

Fig.1: Distillation setup

Solvent extraction

140 g of the dry sample of lemongrass from the sliced lemongrass sample and 200 ml of Diethyl ether solvent were poured into the flask. The flask and content were allowed to stand for 18 hrs. The extract was decanted into another beaker. 200 ml of ethanol was added to extract. The mixture was separated in a separating funnel. The ethanol extract and diethyl ether layer were collected into two separate beakers. To remove the ethanol, the sample was kept in water bath at 75-80 degree C. The yield of oil was determined by weighing the extract.

Enfleurage method

140 gram of the dry sample of lemongrass was pounded with mortar and pestle (to reveal the tighter inner stem). 70 ml of light-flavored olive oil and the mashed lemongrass were mixed in a beaker. The aluminum foils were used to cover beaker. Then it was shaken for distribution of the lemongrass. It was then allowed to stand for 18 hours at room temperature.140

ml ethanol was added to absorb the essential oil leaving behind the light-flavoured olive oil and the lemongrass residue. To remove the ethanol, sample was kept in water bath at 75-80 degree C. The yield of oil was determined.

Formulation of perfume from extracted essential oil

Two tablespoon of lemongrass essential oil extract, one tablespoon of vodka and one tablespoon of sandalwood oil were added together. The solution was shaken and stored in an air tight bottle.

RESULTS & DISCUSSION

By using solvent extraction, 2.9 grams of essential oil per 140 grams of dry lemongrass sample was obtained. This gives about 2.07% yield of essential oil. By enfleurage method, 2.74 grams of essential oil per 140 grams of dry lemongrass sample was obtained. This amounts to 1.957% oil yield. 1.325 grams per 140 grams of lemongrass sample was obtained by hydro distillation process, i.e. 0.946% yield of oil.

CONCLUSION

In the present work three methods are used for extraction namely solvent extraction, hydro distillation and enfleurage. It was observed that solvent extraction method yielded 2.07% essential oil followed by enfleurage method with 1.957% and hydro distillation with 0.946% yield of essential oil respectively. It can be seen that solvent extraction gives the highest yield because of the less exposure to air and heat. Also using a fixative and carrier solvent, the extracted essential oil was formulated into perfume.

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