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Extraction and formulation of perfume from lemongrass

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Abstract
The term "fragrance extraction" describes the process of removing fragrance from raw materials using techniques including pressing, solvent extraction, distillation, or floral aroma. Extracts refer to essential oils, absolutes, concentrates or oils, depending on the contents of mthe package. Exposure to heat, solvents, or oxygen during the extraction process can cause products to stink, while also changing their odour, identity, or making them taste bad. During this process, the essential oil is extracted from the lemongrass plant using three methods: solvent extraction, hydrodistillation, and floral aroma. Obtained by 2 solvent extraction. 08%, enfluerage method 1.96% and hydrodistillation 0.95% essential oil. From the analysis, solvent extraction yielded the highest results because the least exposure to air and heat based on quantitative data. Extracted essential oils are made into perfume using fixatives that extend the life of the perfume and the product.

Keywords: lemongrass, essential oil, perfume, solvent extraction, hydro distillation

Introduction

In the Poaceae family, lemongrass is a fragrant herb that grows between 210 & 315 cm tall. The panicles are quite enormous, drooping, and loose, measuring between 30 and 80 cm in length. The leaves are linear & lanceolate (125 x 1.7 cm). The hue is usually a light grey or gray-green with a hint of red. It consists of a variety of cluster-like, flattened, slightly hairy pairs. Low sessile shallow depression spikelet glumes with one to three nerves & one or two depressions. The crop is multiplied vegetatively by separating clumps with 110 to 150 tillers or clusters into thin ones. Over 200 clusters have been observed. It is a brand-new fragrant oil that has been used to avoid jet lag, reduce cellulite, and revive the body & mind when they are worn out.

Fig 1: Lemongrass Plant

Propagation

It is created vegetatively by slicing apart a group of people, each of whom has between 110 and 150 siblings. There are groups having more than 200 passports.

Management

Lemongrass should be planted with 90 cm between segments and 60 cm between rows. Plants that are planted closely together generate more weeds than those that are farther apart, but the rise in oil yield is not as significant as the increase in grass yield.

Economic uses of lemon grass

- Flavoring
- In addition to adding flavour to food, such as in chicken recipes, spices are also utilised in sherbet and beverages like tea.
- Soil Erosion Control
- used as mulch for different plants and trees
- a useful crop for preventing soil erosion.
- Oil
- Distillation produces commercial lemongrass oil or Indian verbena oil, both of which have a strong lemon flavour and aroma.
- Used to separate citral for the production of vitamin C. Citral is used to flavour food and as a beginning ingredient in the production of ionone.
- Fuel: The distillation process uses the plant waste left behind after oil extraction as fuel.
- Medicinal
- To treat headaches, crushed leaves are applied to the face and forehead.
- Root decoction has diuretic properties.

Lemongrass oil

- Origin of lemongrass oil
  a perennial plant with long, slender leaves that is native to India and is quickly growing and aromatic. It develops a network of large and small roots that quickly erode the soil. It is referred to as "chumana pulu" in India, where it is also known as "Indian verbena" or "Indian lemon balm oil" and is used in Ayurvedic medicine to treat plague and reduce fever. It is a valuable component in citrus soaps and perfumes and serves as an insect deterrent.
- Properties of lemon grass oil
  Lemongrass oil has a watery viscosity, a dark yellow to amber colour, and a lemony, pleasant scent.

- Chemical composition
  Contains lemongrass oil, myrcene, citronellal, geranyl acetate, nerol, geraniol, neral and traces of limonene and citral.
- Extraction
- From fresh or partially dried leaves, lemongrass oil is extracted via steam distillation.
- Uses of lemon grass
  Lemongrass oil revitalises the body and cures jetlag symptoms, clears headaches, and aids in the treatment of nervous weariness and stress-related illnesses. It is an excellent overall tonic for the body, and it promotes glandular secretions while also stimulating the parasympathetic nervous system, which is beneficial for recuperating from illness.

Methodology

Perfume can be manufactured by following steps

1. Collection
2. Extraction
3. Blending
4. Aging

They are as follows,

1. Collection

Initial ingredients must be delivered to the manufacturing facility before the manufacturing process can start. All across the world, plant materials are gathered and frequently hand-selected for their aroma. By directly extracting the fatty ingredient from the animal, animal products are made. Synthetic perfume is made in a laboratory by perfume chemists using aromatic chemicals.

2. Extraction

Several processes, including steam distillation, solvent extraction, enfleurage, maceration, and expression, are used to extract oils from plant matter.

a) Steam distillation

The essential oil is transformed into a gas as the steam travels through the stationary plant material. The gas is then cooled, liquefied, and collected as it travels through tubes.

b) solvent extraction

The flower's scent is preserved by dissolving the flower components in benzene or petrolatum. After the alcohol has evaporated, the fragrance is dissolved in it and heated to extract it

c) Enfleurage

Flowers are preserved on glass sheets that have grease applied to them to absorb the smell.

d) Expression

The citrus fruits or plants are mechanically or manually pressed to get all the oil.

1. Blending

The essential oils are ready to be combined once they have been collected. Lemongrass and rose essential oil extracts totaling 10 ml each were added to a 120 ml beaker containing 5 ml of methanol. To increase the longevity of the scent, 5ml of fixatives were added to the mixture. Shaking the mixture before pouring it into a 50 ml bottle.

2. Aging

In order to guarantee that the desired aroma has been produced, fine perfume is frequently aged for several months or even years after combining.

Facilities required

- Retort stand
- Separation funnel
- Beaker
- Electronic weighing balance
- Water bath
- Mortar pestle
- Round bottom flask

Material and methods

Sample preparation

The Caritas University in Enugu, in the state of Enugu, acquired a fresh lemongrass sample from its garden. For about three days in the lab, the sample was allowed to dry. In order to show the inner, more compact stem, the leaves were afterwards cut into slices and stored until needed.

Apparatus and reagents

- A retort stand
- 500ml Separation funnel
- 250ml and 100ml Beakers
- Electronics weighting balance (V 100)
- Water bath (DC 1000)
- Mortar and pestle
- 500ml Round bottom flask
- Knife
- Aluminum foil
- Electric heater
- Distilled water
- N-hexane
- Ethanol

Procedure for solvent extraction method

From the sample of sliced lemongrass, 130 g of dried lemongrass was weighed out and put into a tidy 500 ml flask with a flat bottom. A 500 ml flask was filled with 600 ml of N-hexane solvent before being stopped. To fully extract the lemongrass's oils and ensure thorough extraction, the flask and its contents were left out for 24 hours. Another 500 ml beaker was then filled with the extract. Since ethanol makes essential oil soluble, 200 ml of ethanol was added in order to extract the oil. The liquid/liquid separation procedure was then used to separate the mixture after it was transferred to a 500 ml separatory funnel. Depending on the various densities, the separatory funnel's contents are balanced and divided into two layers. Two separate 250 ml beakers containing the upper hexane layer and lower ethanol extract were combined before being submerged in a 78° C. water bath. By doing this, the ethanol was eliminated, leaving only the pure essential oils. By weighing the extract on an electronic scale, oil yield was calculated. The weight of the essential oil was determined by comparing the end weight of the glass with the extract to the initial weight of the glass when it was empty.

Fig 2

Procedure for enfleurage method

To reveal a denser inner stem, 130 g of dried lemongrass samples were weighed and pulverised in a mortar and pestle. A 500 ml beaker was then filled with the pulverised sample. To ensure that the essential oils were properly absorbed, lemongrass purée was cooked in about 70 cc of mild olive oil. Shake the glass while it is wrapped in foil to distribute the lemongrass throughout the oil. For optimum absorption, it was then left at room temperature for 24 hours. After adding 140 ml of ethanol to absorb the essential oils, the lemongrass and light olive oil flavour remained. To remove the ethanol and solely retain the essential oil, decant off the ethanol extract and place in a 78 °C water bath. Weighing on an electronic balance was used to calculate oil yield. The yield of essential oil is the difference between the final weight and initial weight of the glass.

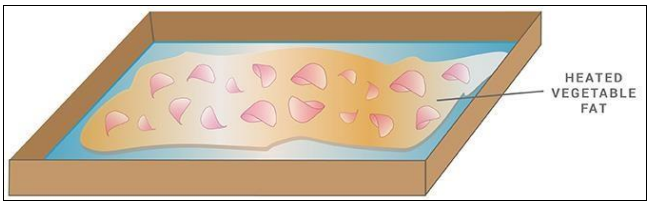

Fig 3

Hydrodistillation method

250 ml of distilled water and 130 g of fresh lemongrass were combined in a 500 ml roundbottom flask. Heat the flask that is attached to the condenser and seal it with a rubber stopper. Steam is condensed as it passes through a condenser while flowing countercurrently over water at 0°C. To extract the lemongrass's essential oils, the water begins to boil at a temperature of 100°C. The essential oil derived from the leaves of lemongrass reacts with heat to form water vapour. Both went through a condenser, where the liquid was formed when the vapour condensed. To cool down and stop essential oils from leaking, ice blocks have been utilised.

Direct collection of the condensate into a 500 ml beaker followed by pouring into a separatory funnel. Thus, two layers of oil and water were created. By turning on the separatory funnel's tap, water was allowed to drain, and the oil was then quickly gathered in the 100ml stopper. To stop the essential oil from evaporating, the bottle is securely shut. Oil was gathered, and the volume of oil was calculated.

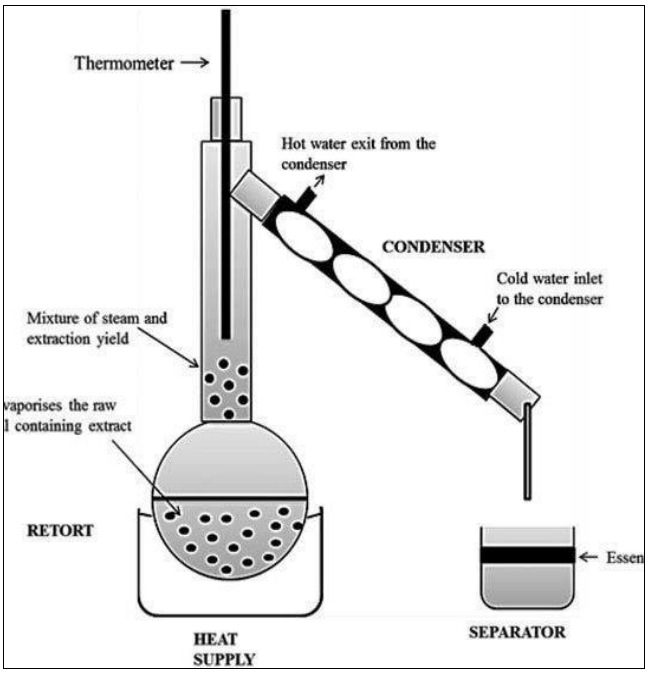

Fig 4: Extraction of oil by hydro distillation

Formulation of perfume with lemon grass essential oil produced

Apparatus and reagents

- Pipette
- Funnel
- 50ml and 120ml beakers
- Perfume bottle
- Fixatives (Surprise and Dream)
- Methanol
- Distilled water
- Lemongrass essential oil

PROCEDURE

A 120 ml beaker containing 5 ml of methanol was filled with 10 ml of lemongrass essential oil extract. To improve the perfume's endurance, 5 cc of fixative were added to the mixture. A 50 ml vial was filled after the solution had been shaken.

Results & discussion

Table 1: Result of essential oil extraction

Method of extraction	% Yield
Solvent extraction	2.08
Enfleurage	1.96
Hydro distillation	0.95

The solvent extraction method is the best extraction method, according to experiments, as it yields more oil than the others. This agrees with the findings of other researchers. When compared to solvent extraction, the Enfleurage method yields less oil, possibly because hydrodistillation offers lower yields while the majority of the volatile components are lost during milling. This might be because heating causes different distillation speeds, which can result in incomplete essential oil extraction

General observation on the prefume produced

- The combination is light yellow; the amount of essential oil has the highest yield during solvent extraction.
- Has a strong lemongrass scent.
- It has a cooling impact on the skin and is volatile.

Conclusion

The extraction of essential oils can be done through hydrodistillation, enfleurage, and solvent extraction. Due to its simplicity, solvent extraction is the most popular and affordable oil extraction technology in the modern perfumery industry. When distillation was not an option due to the denaturement of some aromatic compounds at high temperatures, enfleurage extraction was frequently used. This approach is not frequently utilised in industry nowadays since it is pricey. The aroma of the essential oils produced by hydrodistillation is strongly reminiscent of the source material. compared to other extraction techniques. It is less expensive since only the cost of the energy necessary to heat the water and produce steam is involved.

The most prevalent substance that is readily accessible from natural resources or other sources is water itself. Essential oils are in high demand for a variety of uses, including medicine, perfumery, soap production, and insecticides, to name a few. It is crucial to collect and synthesise these oils from local sources, particularly lemon grass, because imported essential oils are quite expensive to meet the demand of our local consumer industries. Lemon grass essential oils can be used to create perfume locally utilising a variety of extraction techniques, leading to the creation of jobs.

Recommendations

To replace the current ones, there is an urgent need for perfume creation using local raw resources. I suggest conducting additional research on the production of essential oils from the wide range of oil-bearing plants in our ecosystem. Since this could not be done due to time constraints, additional work should be done to analyse lemongrass essential oil. To ascertain which of the constituents of lemongrass essential oil is responsible for the features of lemon grass odour, it is important to characterise them. Additionally, feasibility studies on the method's economic viability should be carried out. Large-scale enzymatic extraction of lemongrass oil should be investigated.

References

1. Ate Tezel, Hortacsu A, Hortacsu O. Multi-component Models for Seed and Essential Oil Extraction. Supercritical Fluids, 1960, 131-167.
2. Ammon DG, Barton AFM, Clarke DA. Essential Oils Introduction and Evolution, 1986, 77-90.
3. Atal CK, BL Bradu. Search for Aroma Chemicals of Industrial Value from Genus Cymbopogon (Jammu lemongrass), New Superior Source of Citral. Indian Journal of Pharmacy,1976:38:61-63.
4. Brophy JJ, Lassak EV, Toia. The Steam Volatile leaf Oil of Lemongrass'' Planta Medica, 1985:51:170-171.
5. Camps Arcadi Boix. Perfumery Techniques in Evolution. Allured Pub Corp, 2000, 101120.
6. Edwards Michael. Fragrances of the World 2006. Crescent House Publishing,2006:50:90-100.
7. Clark E, Grande I. Study of Odour Variation with Structural Change in Cosmetic Perfume. Florida: CRC P Press, 1975.
8. Coulson JM, Richardson J. Particle Technology and Separation Process. India: Elsevier Publishers, 2003, 6.
9. Dorland E, Rogers M. The Fragrance and Flavour Industry. London: Longman publishers, 1977, 5.
10. Eke E, Ogbu J, Okoro k. Isolation of Essential oils from Plants. India: Elsevier Publishers, 2005, 7.
11. Free Mantle MH Onyinbo L, Tidy SG. Essential science Chemistry. Ibandan: University press, 1992.
12. Moore MJ, Micheal O. Fragrances of the World 2006. London: Crescent House Publishing, 2006.
13. Ralkin Robert R, Jellinek, J Stephen. Leaching Method, London: Longman publishers, 1994.
14. https://images.app.goo.gl/rSk6mShhDH3ttwYX7
15. https://images.app.goo.gl/LG1yTg1aKMKRvGzZA