XUNTA DE GALICIA | CENTRO INTEGRADO DE FORMACIÓN PROFESIONAL POLITÉCNICO DE SANTIAGO

EXTRACTION OF ESSENTIAL OILS

DECEMBER 2023

Made by the students of Higher Technicians in Chemical & Environmental Health

CIFP POLITÉCNICO DE SANTIAGO

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MACERATION

GOAL:

.The extraction of essential ils from Calendula flowers

INTRODUCTION:

Upon maceration we extract the dissolved scent or with a the aid of a solvent.

This process can be done in water or in oil. This method is commonly employed for plants, oregan, bay and rosemary, but it also can be used for flowers, such as Calendula.

EXPERIMENTAL PROCEDURE

1. 200 ml of almnd oil(for cosmetic use) is poured into a 500ml beaker.
2. 50g of dried calendula flower (this amount can be determined up to the consumer's choice) and are thorouughly mixed with a glass rod.
3. If the extraction process needs to be shrotened, as in our case, the mixture is heated up to no more than 45ºC. The temperature must be controlled to prevent the deterioration of calendula's oils properties.
4. The heat is maintained, so the temperature is within a 40-45ºC range, for 15 minutes.
5. The macerated mixture is aged overnight to improve the extraction process.
6. The day after, with the aid of a gauze or a thin fabric and colandera, the mixture is filtered.
7. After filtering the process is over.

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STEAM DISTILLATION

GOAL:

The extraction of essential oils by steam distillation.

INTRODUCTION:

The steam distillation technique is commonly employed for the obtaining of essential oils from vegetal tissues.

These essential oils are usually composed of complex mixtures of hydrocarbons, terpenes, alcohols, aromatic aldehydes and phenols contained in leaves, crusts or seeds of some plants.

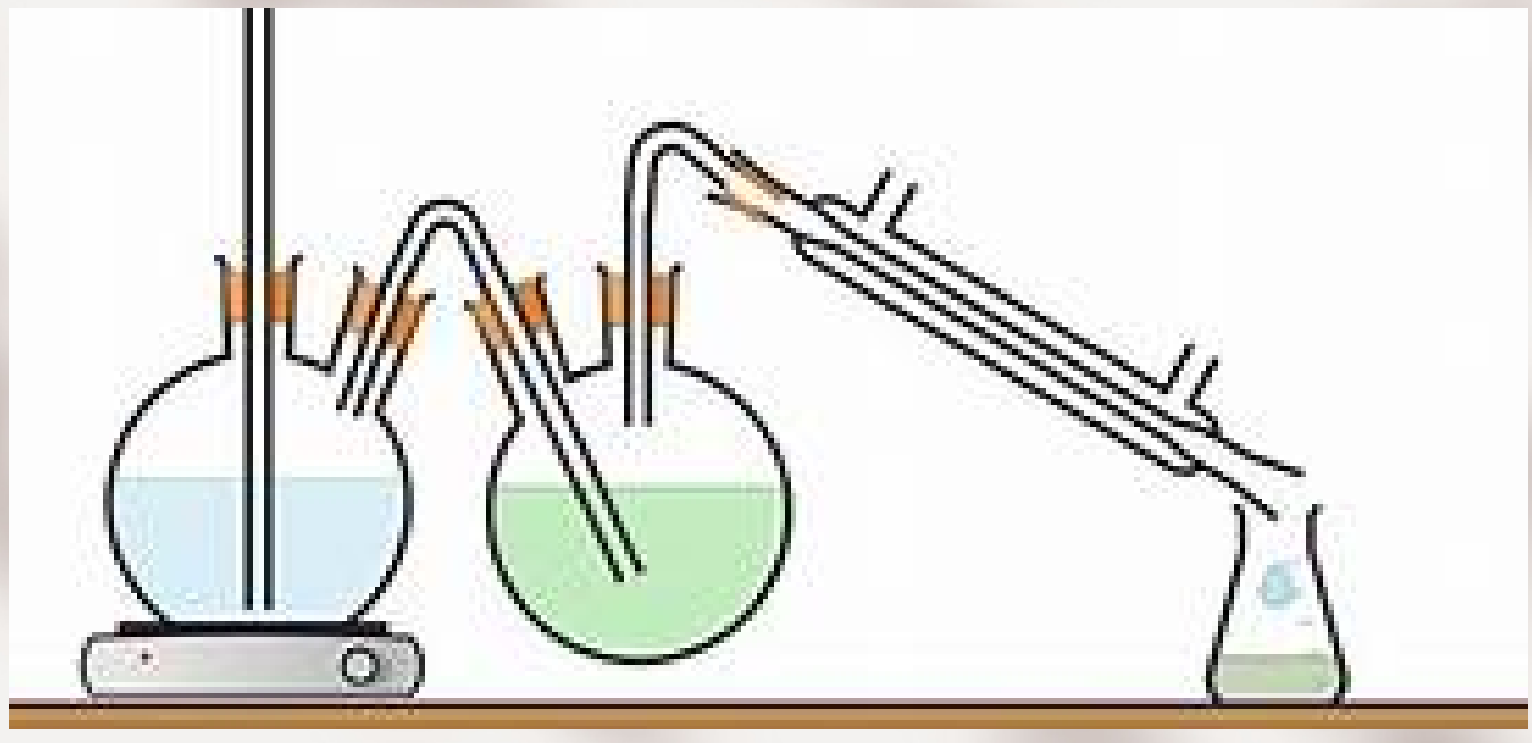
To obtain the essential oils, the plant elements must be crushed down to expose the oils to the steam action.

This technique is used for the separation of water-insoluble substances and with higher boiling points, distillating them at lower temperatures preventing, this way, their decomposition.

The vapours of the volatile compounds are dragged by the steam current. When the addition of the water steam pressure and the volatile compounds equals atmospheric pressure, there is a distillation of both phases, obtaining an immiscible mixture of water and essential oils when condensed.

STEAM DISTILLATION

ASSEMBLAGE OF THE STEAM DISTILLATION SET



EXPERIMENTAL PROCEDURE

1. In the first of the round bottom flasks is are poured 500ml of distilled water with some boiling chips. This flask possesses an overpressure security system and is connected to the second flask with a U-tube.
2. In the second round bottom flask is filled with the material containing the essential oils.
3. 150g of orange or lemon crusts without endocarps or 150g of fresh eucalyptus leaves are placed inside. In both cases, the materials have to be finely grounded. The second round bottom flask is a 1 litre two-mouthed one. The material has to be placed making sure that it does not touch the grounded-glass zone. Some water is poured to enhance steam contact with the essential oils.
4. At the end of the system is the receiver where our distilled substance, composed by a hydrosol with the essential oils.
5. Once the setup is ready, the first flask is heated and the condenser filled with running tap water.
6. Steam distillation time is usually around 45 minutes to 1 hour once the steam makes contact with the plant fragments.

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CLEVENGER'S DISTILLATION METHOD

GOAL:

The extraction of essential oils by hydrodistillation, commonly known as Clevenger's distillation method

INTRODUCTION:

This is a variant of steam distillation, where the material to be extracted is in the same vessel as water. This way, the extraction takes place simultaneously. The mixture is heated and the generated vapours are later condensed and separated. The close contact of the material with the boiling water might provoke changes in the quality of the obtained essential oils.
Hydrodistillation has to be employed with higher boiling point essential oils to prevent decomposition problems or undesired secondary reactions or byproducts.
The Clevenger apparatus allows long-run distillation as the generated steam is recirculated continuously to the distillating flask.
In addition, it is possible to follow the quality of the obtained essential oils as the distilled material is stored in a Dean-Stark receiver.

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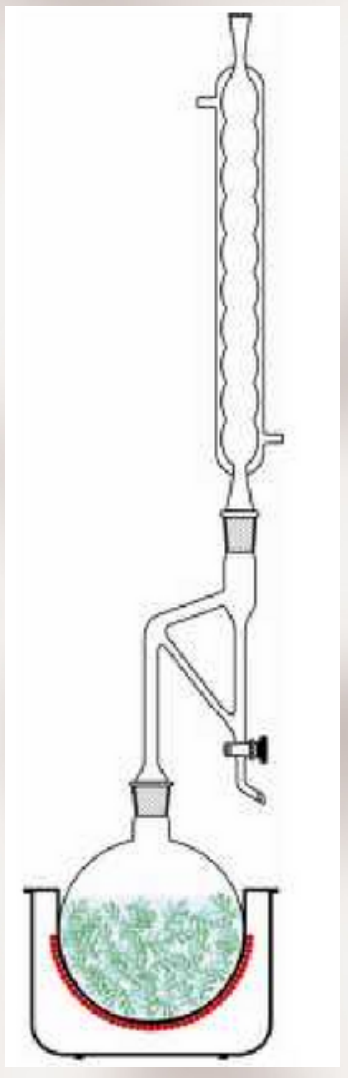
CLEVENGER'S DISTILLATION METHOD

ASSEMBLAGE OF CLEVENGER'S APPARATUS



EXPERIMENTAL PROCEDURE

1. 30g of dried highly minced lavender flowers (or 100g of fresh eucalyptus leaves). The material is placed into a 1-litre distillation flask with 500ml of water and some boiling chips.
2. Once the water and plant pieces are inside the flask, the Clevenger apparatus is coupled.
3. Over the Clevenger is placed the condenser with the tubing already connected.
4. The running tap water is slowly opened and the heating mantle is switched on.
5. The Clevenger possesses a stopcock at the bottom of the graduated zone, which allows the extraction of the scents but, its design makes possible the recirculation of the condensed water. This recirculating system makes possible long-run distillations without the addition of extra water.
6. The process usually needs 45 minutes to 1 hour to extract the essential oils. When no longer essential oils are stored the process is over.

NOTES :

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Activity performed by the students of Higher Technician in Chemistry and Environmental Health cycle.

Thees scents were obtained for the collaboration with the soap making shop, run by the students os Higher Technician in Laboratory and Quality Control of the the Chemistry Department of CIFP POLITÉCNICO DE SANTIAGO

WE HOPE THIS WILL BE OF YOUR INTEREST AND JOY