

Sustainable agriculture for the future

April 2026

No 156

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# Essential Oils: Small-Scale Extraction Methods

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**W**hen you peel an orange, you become aware of a special aroma that is released by the fruit. This is the essential oil in the orange peel, and these are the compounds that give herbs, spices, fruits and flowers their flavour and perfume. Essential oils are found in the seeds, bark, leaves, roots, flowers, balsam, wood, and resin of plants.

There are 4 basic methods of essential oil distillation:

- Hydro distillation.
- Water-and-steam distillation.
- Steam distillation.
- Vacuum distillation.

Of these hydro distillation, and water-and-steam distillation are most used for the small-scale extraction of essential oils.

The choice of distillation method is dictated by:

- The sensitivity of the essential oil to the action of heat and water.
- The volatility of the essential oil that will be extracted.
- The water solubility of the essential oil that will be extracted.

## Hydro Distillation

In the hydro distillation process the plant material is fully covered in water and then boiled to obtain the essential oil. A copper





still is fitted on a brick furnace. The still is then filled with plant material. The plant material is completely covered with water to the top. The condenser is placed in a water tank and connected to the still. The various joints are properly sealed. The essential oil vapour and the steam is collected and condensed in the copper container and the separated.

Hydro distillation produces oils of a lower quality and has some drawbacks:

- The plant material closest to the bottom wall of the still is in close contact with the furnace fire, which could cause the material to char and impart an undesirable odour, known as a burning note, to the essential oil.
- Oxygenated substances tend to partially dissolve in the water in the still and cannot be completely removed.
- Because the stills used for hydro distillation are small, it takes time to extract enough essential oil, which often leads to high grade oil being mixed with oil of a lower quality. This in turn reduces the grade of the final product.

- Hydro distillation is a slow process, requiring a long distillation time, which means it consumes a lot of firewood/fuel.

It is also important to note that the quality of the oil obtained through this method is directly related to the skill of the processor in:

- Managing the still.
- Selecting the raw plant material.
- Preparing the raw plant material.

### **Water-and-steam Distillation**

The water-and-steam distillation method is an improvement on hydro distillation whereby a perforated grid is placed in the still just above the bottom. The main equipment used in water-and-steam is:

- The distillation still which is usually made from stainless steel.
- Condenser.
- Oil separator and receiver.
- Brick furnace.

During operation the still is fitted with a perforated grid and placed directly on the furnace. The furnace is fuelled with agro-waste and/or firewood. The plant material to be extracted is placed in the perforated grid; the still is filled with water to below the grid. The still is then connected to the condenser with a vapour line and the distilled condensate oil and vapour mixture is separated in the oil separator.

Water-and-steam distillation is extremely popular due to the simple construction of the equipment, its low cost and easy operation.



## Essential Oils Commonly used in South Africa

Common Name	Variety	Uses	Part of Plant Used
Geranium	<i>Pelargoniums</i>	High-grade perfumery products and in soaps, talcum powders and creams; for the flavouring of beverages	Green herbage
German Chamomile	<i>Matricaria recutita</i> ( <i>Matricaria chamomilla</i> )	Tea; flavour in alcoholic beverages (liqueurs); cosmetics	Flowers
Lavender	<i>Lavebdula Grosso</i> ( <i>Lavendula Herchum Blue</i> ) ( <i>Lavendula Mailette</i> ) ( <i>Mavedula No.9</i> )	Fragrance; medicine	Flowering tops
Lemon Balm	<i>Melissa officinalis</i>		Leaves & tops
Lemon grass	<i>Cymbopogon citrates</i>	Preparation of ionones; in less-expensive fragrance work; aerosol deodorants; odour masks	Green herbage
Oil roses	<i>Rosa</i>	High grade fragrance in cosmetics, toilet water & perfumes	Flowers
Peppermint	<i>Mentha piperita</i>	Flavouring applications in pharmaceutical industry; candies; confectionary	Green herbage
Roman Chamomile	<i>Anthemis nobilis</i>		Flowers
Rosemary	<i>Rosmarinus officinalis</i>	Liqueurs; medicinal wines	Leaves
Sage	<i>Salvia officinalis</i>		Leaves
Spearmint	<i>Mentha spicata</i>	Flavouring of toothpaste; candies	Green herbage
Sweet Marjoram	<i>Organum marjorana</i>	Flavoured spirits, liqueurs, vermouths	Leaves
Thyme	<i>Thymus vulgaris</i>	Disinfectants & antiseptics; in soaps; flavouring food products	Herbaceous tops
Yarrow	<i>Achillea millefolium</i>		Leaves & tops

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