

## Authors

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# Formulation of hydrosols and investigation of their antifungal properties

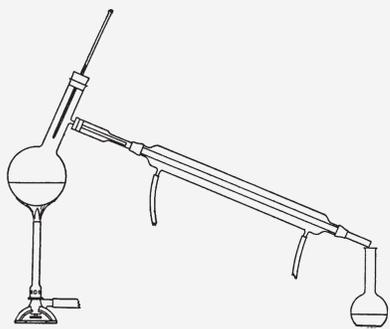
## INTRODUCTION

Essential oils and hydrosols, extracted from plants such as eucalyptus, oregano, and thyme, are celebrated for their aromatic and bioactive properties. These natural extracts are abundant in compounds like eucalyptol, thymol, and carvacrol, which are recognised for their potential antimicrobial and antioxidant effects.

## OBJECTIVE

This research aims to isolate these substances using two methods: solvent extraction and steam distillation, both of which influence the yield and composition of the oils and hydrosols. The isolated oils and hydrosols will be tested for their antibacterial and antifungal effects through microbiological assays. Additionally, we will analyse the components and evaluate their antioxidant properties.

## MATERIALS AND METHODS

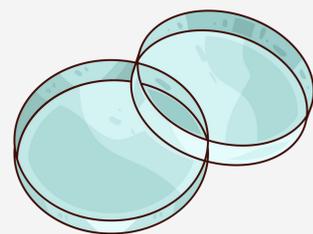


### Steam distillation

- 20 g plant extract
- 200 ml water

### Solvent extraction

- 20 g plant extract
- 100 ml ethanol

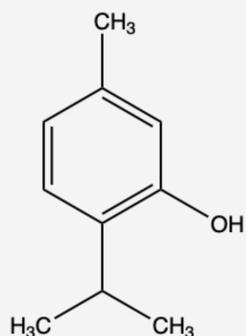


### Antimicrobial properties

- Tryptic soy agar medium
- *Staphylococcus aureus*
- *Escherichia coli*
- Disc diffusion method

### Antifungal properties

- Yeast peptone dextrose agar
- *Saccharomyces cerevisiae*
- Disc diffusion method



### Thin layer chromatography

- Hexane/ethyl acetate (7:3)
- Silica plates
- UV-light (254 nm)

### Antioxidant properties

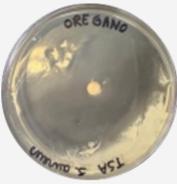
- Apple juice
- Potassium metabisulphite
- Centrifuge
- Turbidity meter

## RESULTS AND DISCUSSION

### Steam distillation and solvent extraction

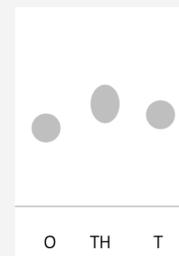
Steam distillation yielded higher essential oil outputs compared to solvent extraction, which was hindered by the presence of green chlorophyll components.

### Antimicrobial properties

Component	Interpretation
	There is a very large zone of inhibition around the disc, resulting in almost no bacterial growth.
	There is a very large zone of inhibition around the disc, with some bacterial growth only at the edges

### Thin layer chromatography

Oils derived from Oregano (O) and from Thyme (T) were compared with commercial thymol (TH) dissolved in DMSO. The spot of thymol was the highest, spot of Thyme was slightly lower and that of Oregano was the lowest.



### Antioxidant properties

To determine the antioxidant properties of the essential oils, these oils were added to freshly squeezed apple juice. After a week, the turbidity of these samples was measured and compared with a blank sample. This showed that Eucalyptus had by far the lowest turbidity value and thus exhibited the highest antioxidant property.

## CONCLUSION

Steam distillation proved to be more effective than solvent extraction, as it avoided chlorophyll interference and yielded higher oil fractions, particularly in Oregano. Both Oregano and Thyme exhibited strong antimicrobial properties, making them promising candidates for further development. Although Eucalyptus was less effective as an antimicrobial, it showed potential for oxidation control. The antimicrobial effects are attributed to a diverse range of oil components, not just thymol, carvacrol, and eucalyptol, highlighting the complex and synergistic nature of these extracts.

## REFERENCES

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