

Thin Layer Chromatography of Eugenol and Clove Oil

Chemicals

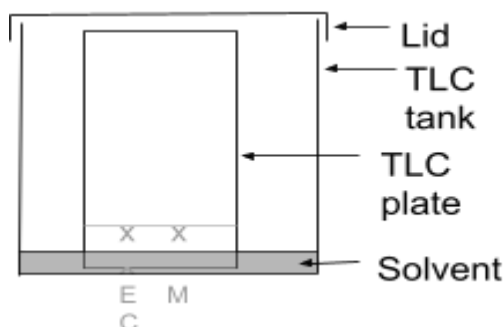
- Clove oil
- Eugenol
- Ethanol
- Cyclohexane:ethyl ethanoate 4:1
- Iodine

Equipment

- TLC plates
- Capillary tubes
- Vials
- Pipettes
- Measuring cylinders 10ml
- Tweezers
- TLC tanks
- Iodine tanks
- Hair dryer
- UV lamp
- Gloves

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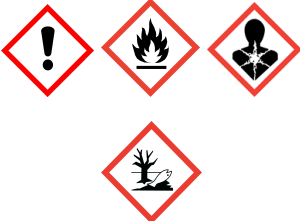

1. Take a thin layer chromatography (TLC) plate, holding it by its sides to avoid touching the surface of the plate. Gently draw a pencil line across the plate about 1cm from one end. Lightly mark three crosses along the line. Write E (for eugenol) under the first cross, M for mixture under the middle cross and C for clove oil under the third one.
2. Add 2ml of ethanol to a vial and add 1 drop of eugenol. Using a capillary tube put a spot of this solution on the crosses labelled E and M on the TLC plate. Add 2ml of ethanol to another vial and add 1 drop of clove oil. Using a new capillary tube put a spot of this solution on the crosses labelled C and M.
3. Carefully place the TLC plate into a tank containing about 0.5 cm depth of the mobile phase which is a 4:1 mixture of cyclohexane:ethyl ethanoate. Ensure that the spots are above the level of the mobile phase. Place a lid on the tank in order to keep the atmosphere around the plate saturated with solvent vapour. The tank should be left undisturbed until the mobile phase has risen to about 1cm from the top of the plate.



4. Remove the TLC plate from the tank and immediately mark the position of the solvent front with a pencil. Leave the plate for a few minutes to allow the mobile phase to evaporate, or use a hairdryer to speed up this process.
5. You will not be able to see the spots, as the compounds are colourless, but they may be visualised by:
 - a. Shining an ultraviolet (UV) light onto the plate (take great care not to point this at your eyes, as it can seriously damage them). The compounds will show up as dark spots. Circle the spots with a pencil.
 - b. Placing the plate in a covered container containing a few iodine crystals. Many organic molecules produce brown spots when exposed to iodine vapour. After about ten minutes the brown spots will appear. The position of the spots may be marked with a pencil as they may fade when removed from the tank. Alternatively the plates can be left overnight to develop fully.
6. Inspect the chromatogram to see if eugenol is a component of clove oil

Experiment Hazard Assessment

Experiment: Thin Layer Chromatography of Eugenol and Clove Oil
Reference: ORG-5

Chemical hazard			
<p>Ethanol</p>  <p>DANGER</p>	<p>Highly flammable.</p> <p>Harmful if swallowed.</p> <p>Toxic in contact with skin.</p> <p>May cause damage to organs</p>	<p>Wear eye protection</p> <p>Ensure laboratory is well ventilated.</p> <p>Ensure no naked flames or other sources of ignition</p>	<p>CLEAPSS Hazcard 40A</p>
<p>Ethyl ethanoate</p>  <p>DANGER</p>	<p>Highly flammable.</p> <p>Causes serious eye irritation.</p> <p>May cause drowsiness or dizziness.</p>	<p>Wear eye protection</p> <p>Ensure laboratory is well ventilated.</p> <p>Ensure no naked flames or other sources of ignition</p>	<p>CLEAPSS Hazcard 43A</p>
<p>Cyclohexane</p>  <p>DANGER</p>	<p>Highly flammable</p> <p>Causes skin irritation</p> <p>May be fatal if swallowed and enters airways.</p> <p>May cause drowsiness or dizziness</p>	<p>Wear eye protection</p> <p>Avoid inhaling fumes</p> <p>Ensure laboratory is well ventilated</p>	<p>CLEAPSS Hazcard 45B</p>
<p>Eugenol</p>	<p>Irritating to eyes.</p> <p>Repeated contact may cause allergic dermatitis. Swallowing may cause severe tissue damage.</p>	<p>Wear eye protection.</p> <p>Avoid skin contact</p>	<p>https://www.prevestdenpro.com/wp-content/uploads/2021/08/MSDS-Eugenol.pdf</p>
<p>Clove oil</p>	<p>May cause skin irritation</p>	<p>Avoid skin contact</p>	<p>https://www.medicines.org.uk/emc/product/4817/smpc#gref</p>
<p>Iodine</p>  <p>WARNING</p>	<p>Harmful in contact with skin</p> <p>Harmful if inhaled</p> <p>Very toxic to aquatic life</p>	<p>Wear eye protection</p> <p>Avoid inhaling vapour</p> <p>Avoid skin contact</p>	<p>CLEAPSS Hazcard 54</p>