

ISOLATION OF EUGENOL FROM CLOVES

Introduction

Steam distillation is a method that can be used to separate water insoluble compounds with high boiling points without exposing them to high temperatures which might cause decomposition or other reactions. The target compound, in this case eugenol, is distilled as a mixture with water. The eugenol may then be extracted from the water using an organic solvent. Moisture is removed from the eugenol using a drying agent.

Method

1. Crush 3-4 g of cloves.
2. Add 50 ml of water in a 100ml round bottomed flask.
3. Let the mixture stand for 15 minutes.
4. Add a boiling chip.
5. Set up distillation apparatus and heat the mixture to boiling at a moderate pace to avoid .
6. Turn the heat down so the rate of distillate production is about 1 drop per second.
7. Collect at least 20ml of distillate.
8. Transfer the distillate to a separatory funnel.
9. Extract the distillate using 10ml of solvent*
 - a. Mix the distillate and solvent gently in a separatory funnel.
 - b. Allow the mixture to stand for at least 10 minutes so that separation occurs.
 - c. Collect the organic layer.
 - d. Repeat the extraction process with another 10ml portion of the solvent.
10. Add about 1g of anhydrous sodium sulfate to the extract and allow to stand for 10-15 minutes.
11. Weigh a clean dry small flask.
12. Decant most of the extract into the weighed flask.
13. Evaporate the solvent by gently heating in a water bath, maintained between 40-50°C.
14. Allow the flask to cool.
15. Reweigh the flask with the eugenol residue.
16. Use bromine water to test for the presence of unsaturation in the sample.
17. Calculate the percent recovery using the equation below.

$\% \text{ recovery} = \text{mass of product} / \text{mass of starting substance} \times 100\%$

Clean up

Add tap water to the residue in the round-bottom flask from the steam distillation. Pour the mixture into a beaker. The liquid portion may be poured down the drain. Scoop the solid portion out and dispose of it in the solid waste container. Wash the flask with dish liquid. A final rinse with acetone should remove any residue. Pour waste acetone into the waste acetone container in the fume hood.