

## Grade 12 Organic Chemistry Practical - ESTERS

**Aim:** To prepare a number of common esters.

**Safety**

|                                                                                                                                  |                                                                                            |                                                                                                                                        |                                                                                             |                                                                                                                                     |
|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
|  sulphuric acid<br>ethanoic acid<br>other acids |  methanol |  methanol<br>ethanol<br>pentan-1-ol<br>other alcohols |  ethanol |  Wear goggles and lab coats <b>at all times.</b> |
|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|

**Apparatus:**

- boiling tubes x 3 and rack
- 100 ml beaker
- 250ml beaker
- water bath or access to hot water
- dropping funnels

**Chemicals:**

- carboxylic acids & alcohols as per table below (2-3 cm<sup>3</sup> each)
- concentrated sulphuric acid

**Method:**

1. In a Pyrex test tube, place about 2-3 ml of methanol and approximately ~1 gram of salicylic acid.
2. Add a few boiling chips to the bottom of the tube.
3. To this mixture add about 0.5 ml (about 15 drops from a dropping bottle) of concentrated sulphuric acid.
4. Warm this mixture in a water bath for 5 or 6 minutes.

**Caution:** DO NOT point the test tube toward yourself or anyone else. Organic compounds such as the one being produced in this experiment may vaporise and spurt out the mouth of the test tube.

5. Pour the contents of the test tube into a beaker containing 50 ml of cold water.
6. Cover the beaker, let stand for a minute or two and then note the odour. Compare this odour with that of methanol. Do you recognise the odour? Have you used something that smells the same?
7. The Ester and water can be flushed down the sink with running water. Rinse out your beaker.
8. Now repeat this process but using a different combination of acid and alcohol from the table below.
9. For each reaction:
  - a. try and identify the smell of the ester.
  - b. write the name of the ester in the table.
  - c. Write a reaction equation for the formation of the ester using full structural formulae.

Some common Esters and their odours.

| ACID      | ALCOHOL  | ESTER             | SMELL                             |
|-----------|----------|-------------------|-----------------------------------|
| Methanoic | methanol |                   | "duco"/paint thinners             |
| Ethanoic  | ethanol  |                   | Pear drops / nail varnish remover |
| Propanoic | Ethanol  |                   | pineapple                         |
| Ethanoic  | Pentanol |                   | banana                            |
| Salicylic | methanol | Methyl salicylate | oil of wintergreen                |

# Grade 12 Physical Science Practical Esters

**N Noddings**



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