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**SSERC Risk Assessment** (revised version March 2018)

(based on HSE’s INDG 163 ‘Risk assessment - A brief guide to controlling risks in the workplace’)

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| Activity assessed | Making Esters |
| *Date of assessment* | 7th December 2021 |
| *Date of review (****Step 5****)* |  |
| *School* |  |
| *Department* |  |

| Step 1 | Step 2 | Step 3 | Step 4 | | |
| --- | --- | --- | --- | --- | --- |
| *List Significant hazards here:* | *Who might be harmed and how?* | *What are you already doing?*  *What further action is needed?* | *Actions* | | |
| *by whom?* | *Due date* | *Done* |
| Alcohols |  |  |  |  |  |
| Methanol is highly flammable and toxic if swallowed, inhaled or in contact with the skin | Technician decanting and possibly pupil/teacher during the experiment. | Keep away from all sources of ignition.  Technician wear goggles (EN166 3) and gloves and work in a well-ventilated room or use a fume cupboard.  Pupils/teachers – very small scale greatly reduces the risk but work in a well ventilated lab, wear goggles (EN166 3) and consider gloves. |  |  |  |
| Ethanol is highly flammable (and harmful if swallowed if using IDA) | Technician decanting and possibly pupil/teacher during the experiment. | Keep away from all sources of ignition.  Pupils/teachers – very small scale greatly reduces any risk and normal laboratory hygiene should mean no other measures are needed |  |  |  |
| Propan-1-ol is highly flammable and causes eye damage | Technician decanting and possibly pupil/teacher during the experiment. | Keep away from all sources of ignition.  Technician wear goggles (EN166 3).  Pupils/teachers – very small scale greatly reduces the risk wear goggles (EN166 3) |  |  |  |
| Butan-1-ol is flammable, harmful if swallowed, a skin and respiratory irritant and causes eye damage | Technician decanting and possibly pupil/teacher during the experiment. | Keep away from all sources of ignition.  Technician work in a well-ventilated room or use a fume cupboard. Wear goggles (EN166 3) and consider gloves  Pupils/teachers – very small scale greatly reduces the risk wear goggles (EN166 3) and work in a well-ventilated room. |  |  |  |
| Pentan-1-ol is flammable, harmful if swallowed and a skin and respiratory irritant. | Technician decanting and possibly pupil/teacher during the experiment. | Keep away from all sources of ignition.  Technician work in a well-ventilated room or use a fume cupboard. Wear eye protection and consider gloves  Pupils/teachers – very small scale greatly reduces the risk wear eye protection and consider gloves. Work in a well-ventilated room. |  |  |  |
| Carboxylic acids |  |  |  |  |  |
| Methanoic acid is corrosive to skin and eyes | Technician decanting and possibly pupil/teacher during the experiment. | Wear goggles (EN 166 3) and gloves for large quantities |  |  |  |
| Ethanoic acid is corrosive to skin and eyes and flammable. It also produces irritating vapour | Technician decanting and possibly pupil/teacher during the experiment. | Keep away from sources of ignition.  Technicians – work in a well-ventilated room or use a fume cupboard. Wear goggles (EN 166 3) and gloves.  Pupils and teachers – very small scale greatly reduces the risk wear goggles (EN166 3) and work in a well-ventilated room. |  |  |  |
| Propanoic acid is corrosive to skin and eyes | Technician decanting and possibly pupil/teacher during the experiment. | Wear goggles (EN 166 3) and gloves for large quantities |  |  |  |
| Benzoic acid is a skin and eye irritant and is harmful if swallowed | Technician decanting and possibly pupil/teacher during the experiment. | Wear eye protection and gloves for large quantities |  |  |  |
| 2-hydroxybenzoic acid (salicylic acid) is harmful if swallowed, causes eye damage and is a reproductive toxin | Technician decanting and possibly pupil/teacher during the experiment. | Avoid raising dust. Wear goggles and gloves |  |  |  |
| Sulphuric acid is an oxidiser and highly corrosive | Technician making dilute solutions by spills | Wear a face mask or goggles (EN 166 3) and gloves. |  |  |  |
| Sodium hydrogen carbonate, solid or solution, is of no significant hazard. |  |  |  |  |  |
| The esters formed are mainly flammable and harmful but only formed in very small quantities so the risk is negligible. |  |  |  |  |  |

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| **Description of activity:**  Small quantities (1 cm3) of pairs of alcohols and carboxylic acid are placed into test tubes.  A few drops of concentrated sulphuric acid are added and the tubes are heated in a water bath.  It is then poured into a small beaker of sodium hydrogen carbonate and the ester forms gently sniffed. |

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| **Additional comments:**  Disposal – The hydrogencarbonate solution neutralises any acids so solutions can be washed to waste with plenty of cold running water. |