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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 | Preparation of Biodiesel |
| *Date of assessment* | October 2016 |
| *Date of review (****Step 5****)* |  |
| *School* |  |
| *Department* |  |

| Step 1 | Step 2 | Step 3 | Step 4 | | |
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| *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* |
| Methanol- is highly flammable (sometimes capable of forming explosive mixtures in air) toxic by all routes and has a specific damaging effect on the optic nerve. | Technician (possibly teacher) by splashes or inhalation of fumes. | Work in a very well-ventilated area normally or in fume cupboard: the latter for large quantities or prolonged working. Use rubber or plastic gloves and goggles (EN 166 3). Beware of repeated exposure.  Keep well away from all sources of ignition. Be aware that pressure can build up in bottles leading to a sudden release on opening. |  |  |  |
| potassium hydroxide is a highly corrosive solid and solution and very harmful if swallowed. Extremely dangerous to eyes as damage can continue long after the initial pain has subsided. | Technician (possibly teacher) by splashes | Wear rubber gloves and eye protection. Use goggles (EN 166 3). |  |  |  |
| Potassium methoxide solution has both the sets of hazards above. | Technician / teacher / pupils by splashes or inhalation of fumes | Work on as small a scale as possible. Work in a well ventilated area or in fume cupboard: the latter for large quantities or prolonged working.  Keep well away from any sources of ignition.  Wear rubber gloves and eye protection. Use goggles (EN 166 3). |  |  |  |
| Kerosine – is flammable and a skin / respiratory irritant. | Technician / teacher / pupils by splashes or inhalation of fumes or by ignition causing a fire or explosion. | Work in a well ventilated environment.  Keep well away from sources of ignition. |  |  |  |
| Burning biodiesel and oils produces smoke. | Technician/Teachers/pupils by inhalation. | While long term inhalation of the smoke from biodiesel or oil is certainly bad, the small amounts used here over a short period of time are not a major worry.  If the room is well-ventilated, the process can be carried out on the bench. If not, a fume cupboard should be used. |  |  |  |

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| **Description of activity:**  Biodiesel can prepared from both fresh and waste (used) cooking oil by mixing with a concentrated alkaline solution and allowing the glycerol to settle from the resulting FAME (biodiesel). The biodiesel can be separated and then washed and dried.  Its pH and viscosity can be compared to the original starting oil.  The energy per gramme of biodiesel can be calculated and compared to that of the starting oil by burning samples in apparatus similar to that used for the Enthalpy of Combustion of alcohols. Care when using the apparatus due to risk of burning.  The energy in the biodiesel can also be compared to that in a fuel such as kerosene. |

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| **Additional comments:**  Kerosene can be burned instead of mineral diesel for comparative purposes. Commercial diesel or petrol should not generally be used. It is not now specifically banned but contains benzene – a known human carcinogen. Small amounts may be used if essential for, say Advanced Higher project work. If so, all work with it should be carried out in a fume cupboard.  See sheets for the design of the apparatus for burning samples and how to make the wick. Collect all solutions and keep for disposal. |