**Laboratory Risk Assessment**

**Part A: Procedure Details**

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| **Title:**  |
| **Use of rotary evaporation to concentrate plant extracts dissolved in 2-butanol** |
| **Brief summary of procedure:** *(append detailed procedures to risk assessment)* |
| Up to 100mL of 2-butanol containing plant extract will be evaporated off using a rotary evaporator (with integrated water bath set to 62°C) until dry. See attached protocol for detailed instructions. |
| **Location Details:** |
| **Department:**School of Biological Sciences | **Location Assessment applies to:**[ ] All HSNO Exempt Labs in Department[x] Specific Location,Building: McLaren Centre Room: 101a-d (Bioactives Research Group) |

**Part B: Approval**

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| **Prepared by: (add additional rows if required)** |
| Name : Dr I M Strange | Signature:  | Date: |
| **Department Laboratory Manager Approval:** |
| Name: John Smith | Signature: | Date: |
| **This Risk Assessment is to be reviewed by:** |
| **Date**: 1 / 2 / 2017  |

**Part C: Hazards Identification**

*Add additional rows as required*

| **Hazardous Substances/Materials** |
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| **Substance name** | **Hazard Classifications** | **Other Hazards/ Exposure limits** | **Max Conc. used** | **Max Qty used** |
| **2-Butanol** | **3.1C, 6.1E(oral), 6.3B 6.4A** | * **2-butanol may form explosive peroxides on concentration**
 | **100%** | **2.5 L** |
| **Plant extracts** | **Non-hazardous** |  |  |  |
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| **Hazardous Equipment/Processes** | **Hazard** |
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| **Rotary evaporator** | **Implosion hazards (under vacuum)****Hot liquid splash (water-bath)****Potential ignition source (electrical)** |
| **Concentration of 2-butanol** | **Potential for explosive peroxides to crystallise out during process** |

**Part D: Risks and Controls**

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| **Risks***Describe what harm could arise from the hazards.* | **Controls***Describe what will be done to manage the risk, e.g. equipment, procedures, personal protective clothing and equipment.* |
| **Explosion could occur if peroxide crystals form during process resulting in serious projectile (glass) proinjuries.** | * Stocks of 2-butanol used for this process are to be labelled “May form explosive peroxides’ and marked with the date received.
* Stocks must be tested with peroxide test strips after 1 year and then at 6-monthly intervals – if >100ppm peroxides detected the container must be discarded.
* 2-Butanol shall be tested using peroxide strips prior to distillation (even if previously tested or less than 1 year old) and discarded if >100ppm peroxides detected.
* Medium impact eye-protection to be worn
* Flask to be wrapped with Poly-Net (Sigma)
* Procedure to be carried out in fume hood with sash lowered to provide protection from projectiles
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| **Implosion of glass flask under vacuum resulting in projectile injury (potential for serious eye injury/lacerations)** | * Flask to be inspected before use – do not use if cracked, chipped or otherwise damaged.
* Medium impact eye-protection to be worn
* Flask to be wrapped with Poly-Net (Sigma)
* Procedure to be carried out in fume hood with sash lowered to provide protection from projectiles
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| **Fire from ignition of 2-butanol vapours by electrical equipment (rotary evaporator)** | * Vapours should be contained within apparatus and re-condensed.
* Any escaping vapours should be extracted by fume hood.
* Rotary evaporator manufacturer data indicates that motor is non-sparking.
* Water-bath temperature (62°C) well below auto-ignition temperature of Butanol (406°C)
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| **Splash with 2-butanol resulting in eye irritation** | * User to wear safety glasses, disposable gloves and laboratory coat.
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| **Inhalation of 2-butanol vapours resulting in drowsiness/dizziness** | * Vapours should be contained within apparatus and re-condensed.
* Any escaping vapours should be extracted by fume hood.
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**Part E: Additional Controls**

*Specify any other additional generic controls that apply to this procedure*

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| **Working in Isolation Controls** |
| *Is the procedure subject to any restrictions on working in isolation? E.g. task may only be conducted between specified hours/Mon-Fri/ or more than one person must be present.*[ ] No [x] Yes, specify below:* Procedure may only be carried out Monday-Friday, 8:30am – 5pm (not including stat holidays or official shut-down period over Christmas).
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| **Hazardous Waste Disposal** |
| *Is the procedure expected to generate hazardous wastes?*[ ] No [x] Yes, specify disposal method:1. Re-condensed 2-butanol waste – recycle into container labelled “used 2-butanol from rotovap”.
2. Containers where >100ppm peroxides detected –clearly mark container as “Contains Explosive Peroxides – DO NOT USE”, verbally inform other users and contact DLM to arrange disposal.
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| **Emergency Procedures** |
| *Does the procedure require any specific emergency procedures not covered by University of Otago Emergency Procedures?*[x] No [ ] Yes, specifiy below: |

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| **Other:** |
| * Before commencing procedure – check that no other chemicals or equipment have been left in hood by previous user. If chemicals/equipment have been left in hood – these must be removed before commencing the procedure.
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**Part F: Training**

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| **Approved Trainers – Specify personnel approved to train users in this procedure:** |
| **Name** | **Position** | **Laboratory** |
| Dr I M Strange | Principal Investigator | Bioactives Research Unit |
| Ken Donaldsan | Technician | Bioactives Research Unit |
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| **Training Record – Record trained users below** |
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| **Trainee Name** | **Signature** | **Trainer Name** | **Trainer Signature** | **Date** |
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