

NATIONAL UNIVERSITY OF SINGAPORE
FACULTY OF SCIENCE

Experiment-Based Risk Assessment Form

Name of Department	Chemistry	Name and Location of Lab	S5-01-07
Name of Laboratory	General Teaching Lab and Synthesis Lab	Name of PI (lecturer-in-charge)	Dr Hoang Truong Giang
Name of Student	Irwan Iskandar, Teo Ai Hwee, Tan Lay San	Name of Activity/Experiment	Isolation of Lavender essential oils using steam distillation

Hazard Identification				Risk Evaluation & Control						
No	Description / Details of Steps in Activity	Hazard(s)	Possible Accident(s) or ill Health, and Persons-at-Risk	Existing Risk Control (Mitigation)	Severity	Likelihood (probability)	Risk Level	Additional Risk Control	Person Responsible	By (Date)
1	Crush 10 g of dried lavender flower using a mortar and pestle and transfer it to a 250 mL flat-bottomed flask. Add 120 mL of hot water and soak it for 20 minutes with stirring.	Physical Hazard: Breakage of flat-bottomed flask. Spillage of hot water. Electrical Hazard: Exposed wires due to fray cables, plugs and/or sockets of the hotplate.	•Cut injuries may result from broken glassware (Flat bottomed flask). •Possible mild burnt from spillage of hot water onto skin. •May result in short circuit and electrical shocks.	•Proper PPE to be worn (gloves, goggles, lab coat, long pants, covered shoes, no contact lenses). •Visual inspection of glassware before any use, Handle glassware with care. •Treat any mild burns with soothing cream and clean up any spillage. •Check the cables, plugs and sockets before use. •Ensure that plugs are dry before use. In the case of fire, use water spray, alcohol-resistant foam, dry chemical or carbon dioxide for extinction.	1	1	1			
2	Assemble a distillation set-up and heat the reaction mixture to boiling and collect about 100 mL of distillate in a conical flask.	Chemical Hazard: Linalool is a skin irritant Physical Hazard: Breakage of flat-bottomed flask and distillation set-up Electrical Hazard: Exposed wires due to fray cables, plugs and/or sockets of the hotplate Human Factor: Spillage of solution from flat-bottomed or conical flask..	•Linalool can cause skin irritation if in contact with skin. •Cut injuries may result from broken glassware (rbf and syringe). •May result in short circuit and electrical shocks.	•Proper PPE to be worn (gloves, goggles, lab coat, long pants, covered shoes, no contact lenses). •Experiment to be performed in a fumeood. •Visual inspection of glassware before any use and handle glassware with care. •Check the cables, plugs and sockets before use, •Ensure that plugs are dry before use. In the case of fire, use water spray, alcohol-resistant foam, dry chemical or carbon dioxide for extinction. •Clean up any spillage to reduce exposure.	1	1	1			
3	Add 30 mL of ethyl acetate to the distillate and separate the layers. Collect the organic layers and subject aqueous layer to 2 more extractions with ethyl acetate.	Fire Hazard: Ethyl acetate is flammable. Chemical Hazard: Ethyl acetate is an eye irritant. Linalool is a skin irritant Physical Hazard: Breakage of conical flask, beaker or separatory funnel. Human Factor: Spillage of solution from conical flask, beaker or separatory funnel.	•Fire may start if ethyl acetate is exposed to sparks, naked flame or other ignition sources. •Ethyl acetate can cause eye irritation if in contact with the eye. Linalool can cause skin irritation if in contact with the skin. •Cut injuries may result from broken glassware.	•Keep away from sparks naked flames and other ignition sources to prevent the catching of fire. •Proper PPE to be worn (gloves, goggles, lab coat, long pants, covered shoes, no contact lenses). •Experiment to be performed in a fumeood. •Visual inspection of glassware before any use and handle glassware with care. •Clean up any spillage to reduce exposure.	2	1	1			
4	Place the combined organic layers in a dry 250 mL conical flask and dry it with anhydrous sodium sulfate over 15 minutes. Filter and collect the solution in a dry 250 mL rbf.	Fire Hazard: Ethyl acetate is flammable. Chemical Hazard: Ethyl acetate is an eye irritant. Linalool is a skin irritant Physical Hazard: Breakage of beaker or conical flask. Human Factor: Spillage of solution from beaker or conical flask.	•Fire may start if ethyl acetate is exposed to sparks, naked flame or other ignition sources. •Ethyl acetate can cause eye irritation if in contact with the eye. Linalool can cause skin irritation if in contact with the skin. •Cut injuries may result from broken glassware (beaker, separatory funnel or conical flask).	•Keep away from sparks naked flames and other ignition sources to prevent the catching of fire. •Proper PPE to be worn (gloves, goggles, lab coat, long pants, covered shoes, no contact lenses). •Experiment to be performed in a fumeood. •Visual inspection of glassware before any use and handle glassware with care. •Clean up any spillage to reduce exposure.	2	1	2			

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5	<p>Remove the solvent by rotary evaporation and run prepare the sample for NMR analysis.</p>	<p>Fire Hazard: Ethyl acetate is flammable. Chemical Hazard: Ethyl acetate is an eye irritant. Linalool is a skin irritant. Physical Hazard: Breakage of rbf or rotavap glasswares. Electrical Hazard: Exposed wires due to fray cables, plugs and/or sockets of the rotavap. Mechanical Hazard: Moving parts of rotavap. Human Factor: Spillage of solution from rbf.</p>	<p>•Fire may start if ethyl acetate is exposed to sparks, naked flame or other ignition sources. •Ethyl acetate can cause eye irritation if in contact with the eye. Linalool can cause skin irritation if in contact with the skin. •Cut injuries may result from broken glassware. •May result in short circuit and electrical shocks. •Part of clothing or hair may get tangled on the moving parts of the rotary evaporator.</p>	<p>•Keep away from sparks naked flames and other ignition sources to prevent the catching of fire. •Proper PPE to be worn (gloves, goggles, lab coat, long pants, covered shoes, no contact lenses). •Visual inspection of glassware before any use and handle glassware with care. •Check the cables, plugs and sockets before use, Ensure that plugs are dry before use. In the case of fire, use water spray, alcohol-resistant foam, dry chemical or carbon dioxide for extinction. •Clean up any spillage to reduce exposure.</p>	2	1	2			
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Conducted By _____

Name Dr Hoang Truong Giang

Signature _____

Date _____

Approved By _____

Name Assoc Prof Yeo Boon Siang, Jason

Signature _____

Approval date _____