Risk Assessment Form

Procedure	Use of microwave oven

Name(s) of person performing the work	Users (Lab manager & Lab Technician & Tenants & Licensee's)		
Name & position of assessor	Khwaja Islam & Laboratory Manager	**Signature**	
Date of assessment	18/02/2020	**RA Number**	BioE 0040

Outline of procedure / activity:

The Microwave oven is located in the Innovation lab 1 (696.10.14) and used for simple heating (e.g. melting agar) or defrosting which can pose number of hazards, including:

- Ignition of flammable vapours
- Exposure to microwave radiation from a faulty or modified unit
- Electric shock from ungrounded or faulty units
- Ignition of materials being heated
- Pressure build-up sealed containers
- Sudden boiling of liquid in an open container following removal from an oven
- Contamination of food products with chemical residues

Training:
Each tenant must have a risk assessment of work activity before using the microwave oven. Operator must be trained in the use microwave oven to guarantee safe daily use.

Risk management & control measures:
To minimize the risk of these hazards, an appropriate combination of the following control measures should be implemented to ensure that the risk to health and safety from the use of microwaves would be low. These must be documented in a risk assessment for the process.

DO NOT:

- Attempt to heat flammable liquids or solids or hazardous substances in microwave oven, whether domestic or laboratory-grade.
- Modify in any way the mechanical or electrical systems of microwave oven.
- Carry out unauthorised repairs on a microwave oven.
- Use a microwave oven in a laboratory for food preparation.
- Heat sealed containers in a microwave including loosened cap or lid which poses a risk since microwave can heat material so quickly that the lid can seat upward against the threads and containers can explode either in the microwave or shortly afterwards.

- Use bottles with a restricted neck opening (e.g. medical flats).
- Place metal objects of any kind in a microwave oven. This includes aluminium foil and plastic coated magnetic stirrer bars.
- Overheat liquids in microwave oven. It is possible to raise water to a temperature greater than the normal boiling point; when this occurs, any disturbance to the liquid can trigger violent boiling that could result in severe burns.
- Attempt to defect the interlock switches that prevent a microwave oven from operating with the door open.
- Place any wire, cables, tubing etc. between the door and the seal.
- Never leave the oven running unattended, however short the time setting may be.
- Never heat a full bottle, always allow plenty of air space above the medium for expansion (i.e. max 300ml solution in a 500ml bottle).

DO:

- Ensure that the microwave oven cavity is adequately ventilated. The unit should be located on a clear open bench and not in a location where the vents could be obstructed by equipment.
- Conduct regular inspections to ensure that the sealing surfaces are clean and do not show any sign of damage. The presence of arcing or burn marks may be indicative of microwave leakage.
- Report defects in equipment or difficulties in operation with a microwave oven promptly to the BioEscalator laboratory manager.
- Use appropriate protective equipment when removing heated liquids from the oven.
- Where glass vessels are used check these for cracks and flaws before using in the microwave oven.
- Use only wide-neck bottles (of the blue top Scott Duran type) to reduce the risk of solid material plugging the neck and causing a build-up of pressure.

The use of a microwave oven to melt agar – additional measures:

Agar can be particularly dangerous and great care must be taken to use the minimum power level only heat for the minimum time. The following precautions must be observed: To minimize the risk of these hazards, users need to adopt the following rules:

- Large amounts (e.g. 250ml) of solidified agar should not be warmed in a microwave oven unless the agar is first chopped up with a sterile spatula or other suitable instrument. Not doing this can cause explosive vapourisation in solid agar where vapour cannot escape.
- Use loose fitting sterile foam plugs or loose 'Kimwipe' plugs, rather than just relying on a loosely placed cap.
- Ensure a good amount of headspace is available in the container above the substance being heated. Set the power and timings correctly. These should have been pre-determined for the volumes normally used in the lab, by controlled experiment and should then be displayed in a prominent position next to the microwave oven.
- Thermal gloves and a face visor must be worn when removing a bottle from the microwave oven.
- Care should be taken when placing the bottle on the bench so as not to cause unnecessary disturbance of the agar, which may cause the agar to boil over.
- Be aware that agar also can be melted in a water bath and this should be the method of choice.

Potential hazards

Substance or item handled	Associated Hazard (s)	Existing Control Measures	Risk (L/M/H)	Further Action required	Risk (L/M/H)
Melting of Agar	Burn Ignition of materials being heated Pressure build-up in sealed containers Sudden boiling of liquid in an open container following removal from an oven	Thermal gloves and a visor must be worn when removing flask from microwave. Never leave the microwave unattended when in use. Ensure a good amount of headspace is available in the flask above the substance being heated. Care should be taken when placing the flask on the bench so as not to cause unnecessary disturbance of the agar, which may cause agar to boil over. Set the power and timings correctly. These should have been pre-determined for the volumes normally used in the lab, by controlled experiment.	M	No further action required if the existing control measures are adhered to.	M

Electrical equipment (microwave)	Possible Electric Shock Exposure to microwave radiation from a faulty or modified unit	Annual PAT Testing. Regular visual checks of power cords for fault, fraying or wear and regular electrical safety check. Any faults reported to lab manager or supervisor. Regular inspections to ensure that the sealing surfaces are clean and do not show any sign of damage. The presence of arcing or burn marks may be indicative of microwave leakage. Glass flask are checked for cracks and flaws before using in the microwave.	L	No further action required if the existing control measures are adhered to.	L

Persons potentially at risk:

Only the user or others near by

Action in event of an accident or emergency:

1. **Fire**: raise the fire alarm and evacuate the area.
2. Spill kit available for large spillage.

Arrangements for monitoring effectiveness of control:

Daily inspection of equipment by lab technician.

Instruction and training given to all operators, which is reviewed annually.

Existing operators receive annual refresher training.

Annual pat testing by external contractor.

Arrangements for monitoring effectiveness of control:
Review of the Risk Assessment:

Date of review		Name of reviewer	
Date of next review		Signature	

Have the control measures been effective in controlling the risk?

Yes	No

Have there been any changes in the procedure or in the information available which affect the estimated level of risk from the listed substances

Yes	No

What changes to the control measures are required?

Declaration by Tenants/Licensees/Technicians:

I confirm that I have read this Risk Assessment and that I understand the hazards and risks involved and will follow all of the safety procedures stated. Where PPE has been identified as a control measure, I will ensure that it is worn.

Declaration by Laboratory Manager (LM):

I confirm that the tenant/licensee/technician who has signed below is competent to undertake the work. My counter-signature indicates that I am happy for the work to proceed.

Name (Please print)	Signature	LM Countersignature	Date

Name (Please print)	Signature	LM Countersignature	Date