***STANDARD OPERATING PROCEDURE – E005***

**USE OF MICROWAVE OVEN**

1. **Objectives**

The objective of this document is to establish standard operating procedures (SOP) for using the microwave oven, ensuring the safety of laboratory personnel by mitigating potential risks associated with hazardous materials and injuries. Additionally, this SOP aims to enhance the efficiency of experimental workflows.

1. **Personal Protective Equipment**

To ensure safety when using the microwave oven, appropriate personal protective equipment (PPE) must be worn by the user. This includes:

* Long pants and closed-toe shoes to protect against spills and splashes.
* A long-sleeved, buttoned lab coat to minimize skin exposure.
* Safety glasses or goggles to protect against splashes or flying debris.
* Heat-resistant gloves for handling hot containers or materials.
* If the user has long hair, it should be tied back.

1. **Potential Hazards**

Using the microwave oven poses various hazards that must be managed to maintain a safe working environment. These include:

* **Burns:** Risk of burns when touching hot surfaces, heated materials, or steam.
* **Explosions:** Risk of explosions if sealed containers, non-microwave-safe materials, or reactive substances are microwaved.
* **Chemical Exposure:** Health risks from improper heating of chemicals or substances that may release toxic fumes.
* **Electrical Hazards:** Risk of electrocution, short circuits, or fires due to improper use or malfunctioning equipment.
* **Fire Hazards:** Risk of fire if flammable materials or substances are placed in the microwave.
* **Slip Hazards:** Spills of liquids or heated materials can lead to slips and falls.
* **Superheating Hazards:** Risk of liquids becoming superheated and erupting when disturbed.

1. **Procedures**
2. Loading the Microwave

* Place microwave-safe container inside the microwave.
* Ensure the container is loosely covered by a microwave-safe lid or paper towel to allow steam to escape.
* **No metal or foil objects** should be used in the microwave oven.
* **For heating agar**: bottles which contain agar should have loosened lids when placed in the microwave for heating. “High” heat may be used in a lower setting. When the agar appears to melt, pause the microwave and swirl the agar in the bottle for 15 seconds before placing it in the microwave for heating. Repeat until agar has fully melted.
* **For heating liquids:** Liquids should be heated in a similar manner to agar. Swirl the liquid between short heating periods to ensure the liquid does not spill over to the turntable in the microwave. Spills on the turntable should be cleaned up immediately.

1. Microwave Settings

* Close the microwave door securely when finished loading items to be heated into the microwave.
* Set the appropriate time and heating power level based on the material being heated.
  + **NOTE:** Start with a lower heating power level to avoid overheating.

1. Monitoring

* Stay nearby while the microwave is in operation to monitor for any issues.
* If unusual noises or smells occur, the microwave should be stopped immediately.

1. Post-Heating

* Once the timer goes off, allow the microwave to stir for a minute before opening to let any residual steam dissipate.
* Carefully open the microwave door.
* Use heat-resistant gloves to remove the microwave-safe container, ensuring it is not too hot to handle.

1. Equipment Maintenance and Repair

* Ensure the microwave is in good working order prior to use. Should electrical malfunctions occur, report to the equipment custodian for immediate repair.

**5) Spills and Incident Report**

* **Any overflow to the microwave turntable must be cleaned up immediately.**
* Promptly notify the Principal Investigator (PI) and / or departmental safety officer (DSO) of any fires or injuries.
* Report any accidents, spills, to the supervisor and equipment malfunctions to the equipment custodian immediately. For serious incidents, contact the Security Unit immediately by calling the 24-hour hotline on **2358 8999**.

**6) References**

* Hofer, M. (2016). *SOP\_SMB020.2: Use of Microwave Oven.* Risk Assessment. The University of Sydney.
* Coleman, N. & Stevenson, G. (2014). *SOP SMB020.2 (GS NC 0314): Use of microwave oven.* The University of Sydney.