**Safe Electrophoresis Use General Guidelines**

General Guidelines are an essential component of the University of Regina’s Health & Safety Management System. This general guideline has been created to provide a set of **Do’s & Don’ts** on how to use electrophoresis equipment. It is expected that the general guidelines will assist in the creation of a lab-specific Safe Operating Procedure.

All general guidelines along with the related Safe Operating Procedures pertaining to you or your group’s activities should be kept in a location central to the work being performed and readily available to the individuals involved in the task.

**General Safety Measures**

Electrophoresis uses electrical energy to separate molecules such as proteins or nucleic acids by their size, structures, and electrical charge. Electrophoresis work poses potential electrical, chemical, and physical safety hazards. Read and follow manufactures’ instructions for the specific electrophoresis equipment.

1. **Electrical Safety** - Typical electrophoresis units operating at 100 volts can provide a lethal shock of 25 milliamps.

* Ensure all switches and indicators are in proper working condition and that power cords and leads are undamaged and properly insulated. If not, contact your Supervsior immediately.
* Label equipment with the warning: “Danger Electrical Hazards.”
* Connect equipment to outlets with ground fault circuit interrupters (GFCIs).
* Use 3-prong plugs.
* Use power supplies with safety features that detect issues with the electrical circuit (e.g., no-load, overload, etc.)
* **Connecting Leads:** TURN OFF MAIN POWER SUPPLY before connecting or disconnecting electrical leads.
* With dry nitrile-gloves hands, connect one lead at a time using one hand only. Be sure the leads/ banana plugs are fully seated.
* **Using equipment:** Put on nitrile gloves, safety glasses, lab coat, long pants, and closed-foot shoes. Remove dangly jewelry. Use additional skin and eye protection when working with UV radiation.
* Don’t run equipment unattended. If this is not possible, contact [health.safety@uregina.ca](mailto:health.safety@uregina.ca).
* Keep equipment clear of unintentional grounding points and conductors (e.g., sinks or other water sources, metal plates, jewelry, pipes, etc.)
* Gel chambers must have a lid or cover with safety interlocks to prevent accidental contact with energized electrodes or buffer solutions.
* Gel chamber exterior must be dry with no spilled solutions. Check chamber for leaks.
* Switch off all power supplies and unplug leads BEFORE opening the gel chamber lid or reaching inside the gel chamber. Do not rely on safety interlocks.

1. **Chemical and Physical Safety –**

* Hazards chemicals commonly used in conjunction with electrophoresis work include: ethidium bromide (mutagen, irritant), acrylamide (carcinogen, neurotoxin, irritant), phenol (corrosive, toxic), and chloroform (suspect carcinogen, toxic). Read Safety Data Sheets.
  + Consider pre-made gels or pre-mixed acryalmide. Consider using ethidium bromide substitutes.
* Lab personnel may be exposure to thermal burns and “boiling over” when heating agarose solutions.
  + Use caution when using a microwave to melt agarose solutions – don’t use sealed containers and beware of superheated liquids that may suddenly and unexpectedly boil. Wear insulated gloves and point the flask opening away from you.
* Ultraviolet (UV) boxes and handheld lamps are often used in visualizing ethidium bromide gels and poses potential exposure to UV radiation (causing burns).