Accident analysis and Prevention

Incident details:

During the insertion of a "comb" (used to build the sample loading wells) into an acrylamide gel solution (SDS-PAGE), (a standard lab procedure for separating protein) the gel solution splashed into the student's eyes. The student was not wearing protective goggles. The student washed her eyes with a non-standard eyewash bottle and sought medical attention.

Safety Violations:

A. Following a splash event, eyes should be flushed with copious amounts of water using a standard eyewash. The eyes should be rinsed for a relatively long period of time, to allow complete removal of any substance/factor that entered the eye.

Eyewash bottles do not comply with the regulatory standards and are therefore prohibited by law, since they do not meet the requirement of washing both eyes at the same time or washing for a 15-minute period of time.

B. According to the requirements of the Safety Unit and the Labor Laws in the State of Israel, a laboratory worker must wear goggles while working in the laboratory and especially when working with chemicals / biological materials or any work that may create a splash or spray event (such as removing test tubes from a liquid nitrogen tank and more).

Additional information can be found on the Safety Unit website and in the safety studies (chemical and biological). https://safety.tau.ac.il

C. Inserting the comb into the gel solution (which has not yet polymerized) should be done slowly and carefully.

Table of Hazard Properties of Materials Used

Chemical Name	CAS #	Health Hazards	Physical Hazards
Acrylamide-Bisacrylamide solution	79-06-1 110-26-9	- Acute oral toxicity -Skin/eye irritant - Carcinogen - Reproductive hazard	Reactive with oxidizing agents, acids, alkalis
Tris Base	77-86-1	Not hazardous	- Not reactive
TEMED- tetramethylethylenediamine	110-18-9	-Causes severe skin and eye burns -harmful if inhaled or ingested - Corrosive	-Highly flammable -Volatile -Open only in fume hood
SDS – sodium dodecyl sulfate	151-21-3	-Skin/eye irritant - Respiratory irritant on inhalation	- Reactive with strong oxidizing agents
APS- Ammonium persulfate	7727-54-0	- Acute toxicity -Skin/eye irritant/sensitizer	- strong oxidizer

- Although not included in the table, keep in mind that acids and bases, that are highly corrosive, are used to bring the solutions to the desired pH.

Personal Protective Equipment (PPE)

- Long sleeved lab coat
- Closed-toed shoes
- Goggles/Face shield
- Nitrile gloves. When using corrosive materials, it is recommended to use a double pair of nitrile gloves (one on top of the other) or gloves that are resistant to chemicals (Butyl rubber).

Safety Procedure

- Avoid any direct contact with these materials. Wash hands after working with these substances.
- Work with flammable and reactive materials should be carried out only inside a chemical fume hood.
- The solutions used for SDS-PAGE gel should be added carefully and slowly between the two glass plates so that they do not splash.
- After adding the upper gel solution (in the same way), carefully insert the "comb" that builds the wells, into the glass system, to prevent spraying of the gel solution.

First Aid Procedures

In case of eye contact

Remove any contact lenses. Flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention.

In case of skin contact

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

If inhaled

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Chemical Spill

- Evacuate the spill area. Avoid breathing vapors. Keep others from entering contaminated area.
- Read the Safety Data Sheet (MSDS). One can use the CAS number to locate the safety sheet in GOOGLE.
- Use appropriate personal protective equipment and clean-up material for chemical spills.
- Open the emergency cabinet and equipped with personal protective equipment for the treatment of chemical spills: goggles, gown and closed shoes, shoe covers, mask if necessary, in accordance with the requirements written in the safety sheet, listed in section 8.
- Spill management is listed in section 6, and action must be taken accordingly.
- Usually the spill should be soaked up/absorbed with an absorbent sleeve or vermiculite unless otherwise stated in the safety data sheet.
- Double-bag the spill waste in clear plastic bags, label and take to the next chemical waste pick-up. In the case of bottle fragments, the fragments should be collected with forceps into a cardboard box that will be placed in a chemical waste disposal bag. Write on the box or bag "broken glass" and the name of the chemical.
- Finally, the floor should be wiped according to what is written section 6 of the MSDS (which refers to the spill) and care must be taken to prevent contact with any material that may react with it (according to what is written in section 10 of the MSDS: Incompatibilities with other materials).

IMPORTANT:

Always use proper personal protective equipment as outlined above, decontaminate equipment and bench tops using soap and water and **properly dispose of all contaminated disposables as chemical hazardous waste (including the gel, tubes and all the disposable equipment's). Do not use the biohazard container/bag.**

Dr. Esther Michael
Biosafety Manager
Tel-Aviv University
Tel. 640-9966
Fax: 640-6533
estermic@tauex.tau.ac.il
https://safety.tau.ac.il