

ACRYLAMIDE

(For assistance, please contact EHS at (402) 472-4925, or visit our web site at <http://ehs.unl.edu/>)

This SOP provides specialized information for the use, handling, and storage of acrylamide in a laboratory setting, a probable human carcinogen. **As with any chemical, please read the Material Safety Data Sheet (MSDS) before use.**

Background

Acrylamide is a common research laboratory chemical. It is used as a cross linking (polymerizing) agent during gel chromatography and electrophoresis. Polymerized acrylamide is not toxic, but the monomer can cause peripheral neuropathy and is a probable human carcinogen.

Symptoms of acrylamide exposure may include irritation at the contact site; ataxia (loss of muscle coordination), numb limbs, paresthesia (tingling); muscle weakness; absent deep tendon reflex; hand sweating; lassitude (weakness, exhaustion), drowsiness; and reproductive effects.

Routes of Exposure

Symptoms of exposure to acrylamide appear to be the same regardless of the route of exposure. Avoid inhalation, ingestion, or absorption via contact with skin or mucous membranes.

Acute Verses Chronic Effects

In many cases, chemicals express both acute (short-term) and chronic (long-term) effects based upon the type of exposure. In studies reviewed for this SOP, the exact time between acute exposure and acute effects in humans was not known. The onset of symptoms was reported to vary from four weeks to 24 months or more. This makes the risk of over exposure to acrylamide particularly hazardous because an acute exposure may not yield symptoms of toxicity for several days to weeks after exposure, during which time there may be continued exposure. It is also difficult to determine whether resulting symptoms of poisoning are due to acute or chronic exposures. A further complication is that the symptoms of acute exposure parallel those of chronic exposure for many if not most symptoms.

Cancer Hazards:

Acrylamide is a probable human carcinogen. Animal studies suggest acrylamide exposure can result in tumors of the lungs, testes, thyroid and adrenal glands.

Methods to Control Exposure

Acrylamide is commercially available in pre-mixed aqueous solutions or in powder form. In the powder form, acrylamide is odorless and white in color. In its powder form, the monomer is extremely dangerous because the dust can easily become airborne and enter the respiratory system. In this regard, pre-mixed acrylamide is safer to use. Un-polymerized acrylamide is of primary concern.

Measuring Acrylamide Powders

While laboratory personnel are strongly encouraged to purchase aqueous stock solutions or pre-made gels, the following procedures are recommended if it is necessary to use acrylamide in powder form.

- Wear nitrile gloves, a lab coat, and goggles during measuring, weighing, and mixing operations. If gloves become contaminated, remove and don clean gloves- nitrile gloves form a low protection barrier.
- While working in a chemical fume hood, take an aliquot from the bulk supply that closely approximates the amount needed. Place the aliquot in a closable container. It is best to tare the container prior to use and then make final weight adjustments at the balance.
- Conduct final weighing transfers carefully to avoid airborne dusts.
- Wash hands after removing gloves.
- Clean fume hood, bench, and balance.

Pouring gels

- Avoid splashes. Replace gloves if they become contaminated.
- After the gel is poured, allow residual acrylamide to polymerize in the flask.
- Polymerized gel can be loosened from the flask with a spatula then disposed of in the collection receptacle for pickup by EHS.
- Areas where gels are poured should be protected with a lab bench cover. Bench covers should be disposed via EHS upon contamination from spilling or after usage.

Post-electrophoresis

- Wear appropriate PPE (gloves, eye protection, lab coats) when dismantling electrophoresis apparatus.
- Gels that are stained with coomassie blue, and then rinsed in a solution containing less than 10% methanol, may be placed in a collection receptacle to dry. When the receptacle is full, the container should be tagged for EHS disposal.
- It is permissible to use the same receptacle for acrylamide and agarose gels, however, if gels are silver stained, they must be collected separately for EHS disposal.