



Procedure for Working with Semicarbazide Hydrochloride and Semicarbazide Hydrochloride-Treated Animals

Introduction

Semicarbazide hydrochloride is a chemical reagent, and an indicator for its metabolic parent nitrofurazone, a veterinary drug that has been banned for use in livestock production in the European Union and the U.S. amongst other jurisdictions.

After Semicarbazide hydrochloride ingestion, experimental animals have developed tremors, ataxia, equilibrium difficulties, and convulsions. Its proposed mechanism of action is by binding to cytosine residues in RNA, to deoxycytosine residues in DNA and to cytosine and deoxycytosine nucleosides.

Semicarbazide hydrochloride has an oral LD50 of 225mg/kg in mice and 123 mg/kg in the rat. Some studies suggest that Semicarbazide hydrochloride is a mutagen, an animal carcinogen and a teratogen. Due to the lack of data in humans and overall limited evidence of carcinogenicity in animals, semicarbazide hydrochloride was classified as an IARC Group 3 agent: not classifiable as to its carcinogenicity to humans.

Due to its equivocal carcinogenic and mutagenic properties, when handling Semicarbazide hydrochloride and animals treated with Semicarbazide hydrochloride, it is imperative to take caution and adhere to the following guidelines to minimize exposure and the effects of exposure during normal and emergency situations.

Safe Work Procedures

Semicarbazide Hydrochloride Preparation

1. Personal protective equipment (PPE): chemical-resistant gloves (e.g., nitrile), lab coat, and chemical goggles must be worn before commencing this step.
2. Semicarbazide hydrochloride solutions must be prepared in a certified chemical fume hood. Appropriate personal protective equipment (PPE) must be worn
3. The containers of Semicarbazide hydrochloride or Semicarbazide hydrochloride solutions must be properly labeled with the identity of the hazardous contents and the appropriate hazard warning (i.e., toxic, possible carcinogen).
4. SEMICARBAZIDE HYDROCHLORIDE solutions must be collected and disposed of as chemical waste. Refer to the Laboratory Hazardous Waste Management and Disposal Manual on www.ehs.utoronto.ca for specific instructions or contact EHS Environmental Protection Services at 416-978-7000 for further information.
5. When all work with SEMICARBAZIDE HYDROCHLORIDE is complete, wipe down all surfaces with detergent and rinse.



Administration of Semicarbazide Hydrochloride

1. Personal Protective Equipment (PPE): chemical-resistant gloves (e.g., nitrile), lab coat, chemical goggles, and surgical mask must be worn before commencing this task.
2. Administration of SEMICARBAZIDE HYDROCHLORIDE to rodents must be conducted in a certified chemical fume hood or a minimum of a Class II, A2 Biosafety Cabinet. Both the personnel administering the Semicarbazide hydrochloride and those in the immediate vicinity of the procedure must wear the appropriate PPE.

Animal Housing

For the first 24 hours post-injection or before the first cage change

1. Personal Protective Equipment (PPE): Follow normal animal care procedures with N95 respirator.
2. Prior to respirator use, employees must complete respiratory fit-testing training. Contact EHS Occupational Hygiene and Safety at 416-978-4467 to arrange training sessions.
3. Signage should be posted in such a manner that it is clear that the animals have been treated by labelling cages with "Warning: Semicarbazide hydrochloride-treated animals: Toxic" and the time of administration.
4. For rodents, cover the cages with filter bonnets.
5. Cage changes should not be performed for the first 24 hours post-injection.

After 24 hours after the final Semicarbazide hydrochloride injection and first cage change:

During handling animals, changing cages and disposing cage waste:

1. Personal Protective Equipment (PPE): Follow normal animal care procedures.
2. The animals may be transferred to clean, standard caging and the door signs and cage tags may be removed.
3. Cage change/dumping should be performed using certified local exhaust ventilation (e.g., biosafety Class II cabinet or chemical fume hood). This local exhaust ventilation should be wiped down after use.
4. Dirty cages and racks should be covered with a full drape and moved to the cage wash for immediate cleaning.

Emergency Response to Exposures and Spills:

In the event of an exposure:

1. Flush body area for a minimum of 15 minutes:
 - a) Contaminated skin should be washed with copious amounts of soap and water



- b) Contaminated eyes and mucous membranes should be irrigated using normal saline or water
2. Notify the supervisor. Supervisor should fill out an online accident/incident e-form either for employees or for students as appropriate.
3. Seek medical attention as soon as possible
4. If in doubt, call EHS Occupational Hygiene & Safety at 416-978-4467 to determine further steps

In the event of a small spill:

1. Only employees trained in the handling of SEMICARBAZIDE HYDROCHLORIDE should clean up spills
2. Wear appropriate PPE
3. Discard contaminated materials in hazardous waste bags
4. If in doubt, call EHS Environmental Protection Services at 416-978-7000

In the event of a large spill:

1. Evacuate people from the immediate area
2. During business hours, call EHS Environmental Protection Services at 416-978-7000.
3. During off-hours, contact the Campus Police.