

SAFETY BRIEF

Strychnine Safety & Awareness for Richardson's Ground Squirrel Control

What Is Strychnine

Strychnine is a highly toxic white odourless, bitter crystalline powder. A 2% liquid strychnine concentrate has been approved for emergency use to control Richardson's ground squirrel populations in select areas, ending in November of 2027.

How Strychnine Works

Strychnine affects the central nervous system, causing uncontrollable muscle contractions. A lethal dose can cause convulsions that lead to asphyxiation (a condition in which the body does not receive enough oxygen, potentially leading to unconsciousness or death). The effects of strychnine can also lead to other serious and potentially fatal complications.



Is There an Antidote?

No.

Persistence in the Environment

Strychnine is a very stable chemical compound. Studies have shown that there is little to no breakdown when it is exposed to light. It can be degraded by microbial activity in some soils; however, degradation by microbes is very slow. Microbial degradation will be even slower in colder and drier regions. Sometimes strychnine can bind to soil particles – when this happens, microbial degradation doesn't appear to occur. Strychnine has poor solubility in water. Contamination of drains and waterways must be prevented.

Source: <https://www.aphis.usda.gov/sites/default/files/19-strychnine.pdf>

Routes of Exposure

Inhalation

Mishandled product may result in this type of exposure, for example, through exposure to small droplets or bait grain dust.

Ingestion

Drinking liquid or eating food that has come into contact with strychnine may result in exposure. Strychnine is highly toxic, small droplets of liquid strychnine or bait grain dust landing on a nearby coffee cup could be fatal.

Absorption

Strychnine can be absorbed through the skin or eyes, including through broken skin. Direct contact or wearing contaminated clothing can lead to absorption.

Secondary poisoning

Secondary poisoning occurs when an animal eats a poisoned animal or its carcass.

Signs and Symptoms of Poisoning

Important: The level of poisoning depends on many factors, including how the organism was exposed (e.g., ingestion versus absorption through the skin or eyes), the amount of poison the organism was exposed to, as well as the size and health of the organism exposed.

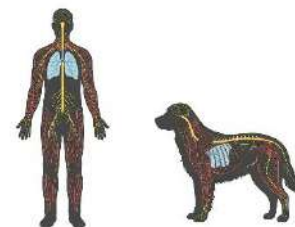
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Human Exposure

Signs and symptoms may appear within 10 to 60 minutes after exposure. Cumulative/chronic toxicity is limited or not well-documented in humans.

- Weakness*
- Joint stiffness*
- Light sensitivity*
- Agitation
- Easily startled
- Uncontrollable arching of neck and back
- Jaw tightness
- Headache*
- Muscle aches*
- Apprehension or fear
- Restlessness
- Rigid arms and legs
- Muscle pain and soreness
- Difficulty breathing



*Possible early symptoms of exposure or mild exposures.

Signs and Symptoms of Higher Level Exposures

Note that between convulsions, the muscles may relax completely. Convulsions may return every 10-15 minutes.

- Dark urine
- Clamped jaw
- Face fixed in a grin
- Trouble breathing
- Painful muscle spasms that may lead to a fever, kidney injury, and liver injury
- Breathing stops (asphyxiation)
- Bluish skin color
- Arched body, clenched fists
- Bulging eyes
- Exaggerated reflexes
- Initial consciousness and awareness of symptoms
- Brain death

Sources: <https://www.cdc.gov/chemical-emergencies/chemical-fact-sheets/strychnine.html>,
<https://calpoison.org/content/strychnine-poisoning>

Dog or Cat Exposure

Signs and symptoms typically appear within 30 to 60 minutes. Note that between convulsions, the muscles may relax completely. Severe muscle spasms can happen on their own or be triggered by touch, sound, or bright light.

Early Signs and Symptoms

- Nervousness
- Stiffness
- Tenseness

Mid to Late Signs and Symptoms

- Trouble breathing
- Breathing may briefly stop
- Severe, long lasting muscle contractions
- Straight legs (like a sawhorse)
- Pupils become large
- Breathing stops (asphyxiation)
- Dark colored urine
- Fever & seizures in dogs
- Rigid muscles
- Gums may turn blue
- Seizures happen more often
- Brain death

Sources: <https://www.ncbi.nlm.nih.gov/books/NBK459306/>
<https://www.merckvetmanual.com/special-pet-topics/poisoning/strychnine-poisoning>

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Storage

Both the 2% strychnine concentrate and 0.4% strychnine bait must be stored under lock and key. Storage in a building might include:

- A locked metal chemical storage cabinet, away from incompatible materials.
- In a spill tray, in an approved firearm safe.
- In a spill tray in a designated poison cupboard that is locked and not easily tampered with or broken into.

Notifying Neighbours

Giving neighbours advance notice before placing 0.4% strychnine bait in approved areas is a good practice. It allows them to take steps to protect their family, workers, livestock, and pets. For example, people who walk their dogs along nearby roads may choose to use a muzzle or walk their dog elsewhere for a period of time until the risk has passed.

Legal & Occupational Health and Safety Considerations

While charges under the Alberta Wildlife Act, Pest Control Products Act, and the Canada Species at Risk Act often come to mind first, producers authorized to use toxic strychnine bait should also remember that they have responsibilities for the health and safety not only of their own workers, but also others (including the general public) who may be affected by the farm's operations.

It is also important to remember that enforcement actions may arise under Alberta OHS legislation, the Criminal Code of Canada (e.g., negligence), or through civil actions.

Alternative Control Measures / Integrated Pest Management

In health and safety, the goal is to remove the hazard completely. When it is not possible, the use of other hazard control measures—such as substitution or the use of multiple control measures—are needed to make the work safer. The use of strychnine is very high-risk, not only for people, but for many other forms of life, and it has negative impacts on the environment. For example, using strychnine to control Richardson's ground squirrels can reduce the number of natural predators in the area, which may lead to increased populations later.

Take the time to create an alternative, ongoing Richardson's ground squirrel control plan. An integrated pest management plan should include:

- Monitoring the pest populations first
- Targeting only problem areas
- Using toxic bait only when other approaches have not sufficiently reduced populations
- Using cultural/mechanical controls where possible
- Keeping records of use and results

Here are some great resources to support you and your community in doing this:

<https://www.alberta.ca/richardsons-ground-squirrel-control>

<https://www.saskatchewan.ca/Business/Agriculture-Natural-Resources-and-Industry/Agribusiness-Farmers-and-Ranchers/Livestock/Pastures-Grazing-Hay-Silage/richardsons-ground-squirrel-management/Control-of-Richardson-Ground-Squirrel>

<https://agriculturalserviceboards.com/wp-content/uploads/2024/10/asbpc-ipm-gopher-ctrl-fact-sheet-1.pdf>