

# Phosphide Intoxication in Cats & Dogs

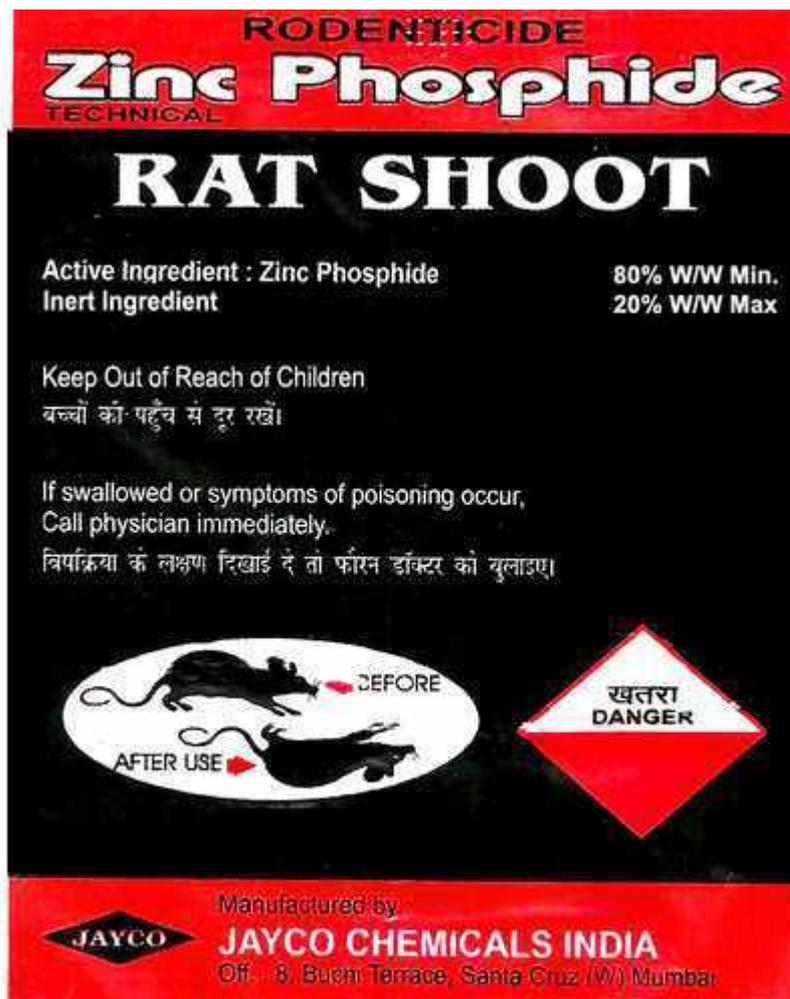
In recent weeks, the emergency team with whom I work has treated several patients for an uncommon toxicity: zinc and aluminum phosphide. So, this week - in the interest of increasing awareness - I've written a post about it. I hope you'll share it with other pet owners to help me reach as many of them as possible. Happy reading!



## What are zinc & aluminum phosphide?

Zinc and aluminum phosphide are common pesticides used for rodent and insect control. Zinc phosphide is most commonly incorporated into pellets, tablets, and powders that are flavored with grain and/or sugar to make them palatable to mice, rats, rabbits, gophers, prairie dogs, etc. Aluminum phosphide is available as a fumigant.

In the body, aluminum phosphide is hydrolyzed by stomach acid into phosphine (PH<sub>3</sub>), a highly toxic gas. Zinc phosphide is first transformed into phosphonium ion (PH<sub>4</sub>) that is subsequently hydrolyzed to phosphine in the small intestine. Phosphine is corrosive to the lining of the gastrointestinal tract. Phosphine is a respiratory toxin that inhibits an important enzyme called cytochrome C oxidase to cause many complications, including pulmonary edema, kidney failure, liver failure, and coagulation abnormalities.



## What does intoxication look like?

Cats and dogs most commonly become intoxicated after they eat bait containing zinc phosphide left out for rodents. Onset of clinical signs depends on the rate of stomach emptying. The median lethal dose is reported to be 20-40 milligrams per kilogram of body weight.

Cats and dogs of any breed, age, or sex may develop intoxication. Clinical signs typically develop within minutes to a few hours. Common clinical signs include:

- Anxiety & agitation
- Increased respiratory rate (called tachypnea)
- Difficulty breathing (called dyspnea)
- Unsteadiness while walking (called ataxia)
- Altered mentation
- Seizures
- Vomiting
- Tremors
- Coughing
- Blue/grey gums (called cyanosis)



## **How are zinc & aluminum phosphide intoxication diagnosed?**

A veterinarian will make a diagnosis of phosphide intoxication based on suspected or known exposure to an appropriate rodenticide and compatible clinical signs. Vomit that smells of garlic or fish is highly suggestive of phosphine gas. The toxic level is less than two parts per million, which is also the threshold detectable by the human nose.

Please remember phosphine gas is toxic to humans. Common symptoms include headaches, nausea, vomiting, diarrhea, stomach pain, dizziness, difficulty breathing, and chest tightness. You should take the following precautions:

- Safely move your dog to a well-aerated area that can be hosed down with water.
- Stand upwind of your dog and do not lower your head down to your dog.
- If your dog vomits indoors, all people and pets should immediately vacate

the area. Doors and windows should be opened to allow adequate ventilation.

- Run a fan at floor level since phosphine gas is heavier than air.
- Call your local first responders as they are able to determine if air is safe.



A veterinarian will also recommend some non-invasive blood, urine, and imaging tests for patients with suspected or confirmed intoxication, including:

- Complete blood count
- Biochemical profile
- Urinalysis
- Chest radiographs (x-rays)
- Venous blood gas
- Electrocardiography (ECG/EKG)
- Coagulation testing
- Measurement of zinc phosphide in vomitus

## **How is intoxication treated?**

There is no antidote for aluminum or zinc phosphide intoxication. The type of intervention needed for intoxicated pets depends on how efficiently intoxication was diagnosed and a pet's clinical signs. Pets with breathing difficulty and seizures require more aggressive therapies.

Those without clinical signs minimally require gastrointestinal decontamination. A veterinarian may recommend inducing vomiting and/or gastric lavage (aka: stomach pumping). Antacid medications are frequently prescribed because they promote an alkaline environment in the stomach that slows the release of

phosphine gas. A pet's prognosis depends on the amount of toxin ingested and the time to initiating therapies. Furthermore, surviving pets may have long-lasting organ dysfunction.

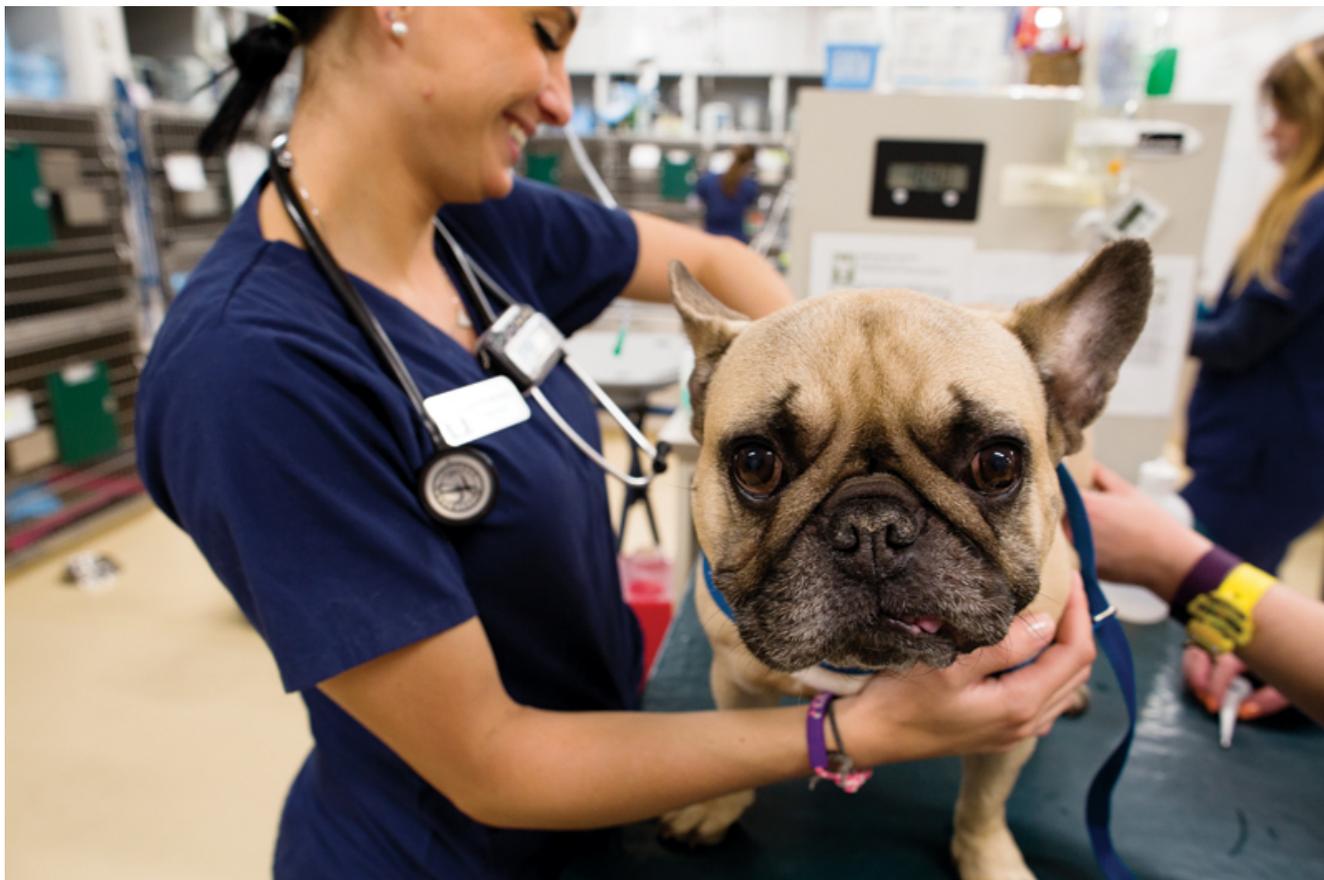


Photo Credit. April Witt

## **The take-away message about zinc & aluminum phosphide intoxication in cats and dogs...**

Ingestion of zinc and aluminum phosphide - both found in rodent baits - are highly toxic to cats, dogs, and humans. A positive outcome depends on the amount of poison consumed and the time to appropriate interventions. With efficient treatment, prognosis is favorable.

To find a board-certified veterinary emergency and critical care specialist, please visit the [American College of Veterinary Emergency and Critical Care](#).

To speak with veterinary toxicology experts, please visit the [ASPCA Animal Poison Control](#).

Wishing you wet-nosed kisses,

CriticalCareDVM