

**INTRODUCTION**

'Tis the season to be jolly, and for pets to get into things they shouldn't. Here are common foods that pets get exposed to, and options for treatment.

Pet owners are often tempted to give table scraps to their pets as a special treat. This seems to be especially true during holidays, such as Easter, Passover, and Fourth of July, as pet owners often include pets in their holiday celebration. Unfortunately, there are some types of human foods that can be dangerous toxic to pets. It is very important that veterinarians and their staff are aware of the possible problems associated with feeding pets the following foods and what to do about them.

### CLINICAL USE INFORMATION

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**Moldy foods**

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**Moldy Foods**
Moldy foods may contain certain **tremorgenic mycotoxins** such as penitrem-A and roquefortine C.\textsuperscript{1,2} Tremorgenic mycotoxins can induce muscle tremors, ataxia, and convulsions that can last for several days.\textsuperscript{1,2} Intoxications have been reported in many species; however, dogs that roam or have access to spoiled foods are more at risk.

Tremorgenic mycotoxins are classified as neurotoxins.\textsuperscript{1,2} While the exact mechanism of action is not known, studies have shown that penitrem-A inhibits the inhibitory neurotransmitter glycine in mice.\textsuperscript{3} Severity of signs can vary from mild to severe, depending on the particular strength of the mycotoxin ingested.

**Treatment goals** following tremorgenic mycotoxin ingestion include minimizing absorption through decontamination procedures, such as emesis, lavage, and activated charcoal, controlling tremors and seizures with methocarbamol, and providing supportive care.\textsuperscript{1} With early aggressive treatment, prognosis is good.

Definitive diagnosis can be confirmed by mass spectrometry analysis of stomach contents.\textsuperscript{1} Veterinary Diagnostic Laboratories that perform the test include Michigan State University Veterinary Diagnostic Laboratory and Iowa State Veterinary Diagnostic Laboratory. It is important to note that analysis of mycotoxins may take several days.

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**Chocolate**

Chocolate is a mixture of cocoa beans and cocoa butter. It contains **theobromine** and **caffeine**, which are both classified as **methylxanthines**. Unfortunately, dogs are sensitive to the effects of methylxanthines. Depending on the dose, methylxanthines can cause hyperactivity, increased heart rate, tremors, and potentially death. Other effects seen with chocolate overdose include vomiting, diarrhea, increased thirst, increased urination, and lethargy.

The amount of methylxanthines present in chocolate depends varies with the type. The general rule is the more bitter the chocolate, the more toxic it could be. In fact, unsweetened baking chocolate contains almost seven times more theobromine as milk chocolate while white chocolate (a combination of cocoa butter, sugar, butterfat, milk solids, and flavorings without cocoa beans) contains negligible amounts of methylxanthines.

<table>
<thead>
<tr>
<th>Type of Chocolate</th>
<th>Caffeine-mg/oz</th>
<th>Theobromine-mg/oz</th>
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</thead>
<tbody>
<tr>
<td>Milk chocolate</td>
<td>6</td>
<td>44-56</td>
</tr>
<tr>
<td>Semi-sweet</td>
<td>22</td>
<td>138</td>
</tr>
<tr>
<td>Baking chocolate</td>
<td>33-47</td>
<td>393</td>
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</table>

The mechanism of action of methylxanthines is to competitively inhibit cellular adenosine receptors which results in CNS stimulation and tachycardia.\textsuperscript{2} Although, theobromine and caffeine have an LD50 of 100 to 200 mg/kg, signs can be seen well
below this dose. Mild signs can be seen at doses over 20 mg/kg, moderate effects are seen over 40 mg/kg, and severe effects are seen at doses over 60 mg/kg.

**Early treatment**, including decontamination procedures such as emesis and activated charcoal, cardiovascular monitoring, and supportive care, is extremely helpful with chocolate poisoning. In addition, fluid diuresis may help enhance elimination. Caffeine can be reabsorbed by the bladder wall which may result in extended times of clinical signs. Therefore, the veterinary staff should take extra steps to keep the patient's bladder empty either through catherization or frequent walking.

**Onions**

Onions are members of the genus Allium (Other members of this genus include garlic, leek, shallot, and chive). Pieces of onion, onion powder, or even cooked onion, can cause damage to red blood cells which could result in anemia in both dogs and cats. The primary toxic component is n-propyl disulfide, which is thought to cause oxidative damage to erythrocytes, resulting in hemolysis. Toxicoses from fresh, dried, or, powdered plant material have been reported in dogs and cats. In one study, dogs developed hemolytic anemia after being fed 30 g/kg of onions once daily for 3 days. Feeding commercial baby food containing onion powder has also been reported to cause toxicity in cats. Clinical signs associated with onion poisoning include hemolytic anemia, hemoglobinuria, vomiting, weakness, and pallor.

**Treatment** consists of decontamination procedures such as inducing emesis and administering activated charcoal, which should be considered with recent ingestions. Afterwards, the animal should be monitored for the development of hemolysis, azotemia, and/or decreased PCV. Whole-blood transfusions or administration of oxygenated hemoglobin should be considered with critical patients. Fluid diuresis is recommended in patients with hemoglobinuria. In addition, supportive care should be administered until patient recovery.

**Macadamia Nuts**

Macadamia nuts may cause problems if ingested by dogs. According to a retrospective study, clinical signs commonly reported in dogs ingesting macadamia nuts include weakness, depression, vomiting, ataxia, tremors, and hyperthermia. The lowest dose reported to cause clinical effects is 2.4 g/kg. In most cases, dogs developed clinical signs within the first twelve hours post ingestion. These signs have only been seen in dogs and the exact cause for their sensitivity is unknown.

**Treatment** includes decontamination procedures such as inducing emesis, administering activated charcoal, and administering enemas. Additional supportive care should be given as needed. The prognosis in most cases is extremely good. Most dogs return to normal within 24 to 48 hours.
**Rising Bread Dough**
Ingestion of rising bread dough can be life-threatening to dogs. The animal's body heat will cause the dough to rise in the stomach. Ethanol is produced during the rising process; and, the dough may expand several times its original size. Signs seen with bread dough ingestion are associated with ethanol toxicoses and foreign body obstruction may include severe abdominal pain, bloating, vomiting, incoordination, and depression.⁹

**Treatment** in cases of recent ingestion in asymptomatic dogs, involves inducing emesis. Analgesia is important in patients exhibiting signs of pain. Administering cool water via a stomach tube or PO may halt the rising process.⁹ In some cases, dough removal may necessitate surgery. Since ethanol can cause an acidosis, it is important to monitor the acid base balance and correct with sodium bicarbonate if indicated.⁹

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**Grapes and Raisins**
Some types of grapes and raisins have been shown to cause kidney failure in dogs when eaten in quantity.¹⁰,¹¹ The basis for kidney failure following consumption of grapes or raisins is unclear, but is currently being studied in the veterinary community. The amount of grapes or raisins that may cause renal failure is not exactly known, so any amount could potentially be dangerous.

As for **treatment** of recent ingestion, inducing vomiting and administering activated charcoal is recommended.¹⁰,¹¹ This should be followed with fluid diuresis for 48 hours.¹⁰,¹¹ During this time the patient should be monitored for azotemia.¹⁰,¹¹ If the animal shows evidence of renal failure, fluids and supportive care should be continued.

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**Tobacco Products**
Tobacco products contain varying amounts of **nicotine** with cigarettes containing 13-30 mg and cigars containing 15-40 mg.¹² Butts contain about 25% of the total nicotine content. The minimum lethal dose in dogs and cats is reported as 20-100 mg.⁸ Signs often develop quickly (usually within 15-45 minutes) and include excitation, tachypnea, salivation, emesis, and diarrhea.¹² Muscle weakness, twitching, depression, tachycardia, shallow respiration, collapse, coma, and cardiac arrest can follow the period of excitation. Death occurs secondary to respiratory paralysis.¹²

**Treatment** with recent ingestion in asymptomatic animals involves inducing emesis. **Never attempt emesis in stimulated animals** as it may trigger a seizure. Activated charcoal has been shown to be helpful in adsorbing nicotine.¹² Patients should be monitored closely and treated symptomatically. Artificial respiration is indicated in patients with respiratory paralysis.

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**Xylitol**
Xylitol is a naturally occurring sugar substitute. Use of xylitol has recently expanded in popularity, and xylitol is found in many sugar-free gums, candies, and other foods. Dogs appear sensitive to xylitol, as ingestion of 100mg/kg xylitol can result in rapid, life-threatening hypoglycemia (no known toxicity exists for humans).13,14 Doses exceeding 500-1000mg/kg have been associated with acute hepatic failure and coagulopathy.13 Treatment is directed at managing the hypoglycemia (dextrose infusions), coagulopathy (plasma transfusions), and supportive treatment for liver failure.

REFERENCES

Journal Articles

Rounds and Other resources
1. Winter Holiday Hazards For Pets - ASPCA Animal Poison Control Center notes.
3. **Chocolate Toxicity** - Client information by Wendy Brooks.