

# Avian Avocado Toxicosis

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Did you know that even a small amount of avocado can be life-threatening to birds? Between January 2006 and December 2011, the ASPCA Animal Poison Control Center managed 1866 calls regarding exotic birds. Of those calls, 48 (2.6%) were related to avocado exposure.<sup>1</sup> This article describes avocado varieties, avocado toxicosis, and treatment options in birds.

## Persea americana Varieties

Of the several subtypes of avocado, the most accessible genus for consumption is *Persea*. *Persea americana* has three main varieties: Guatemalan, Mexican, and West Indian. In the United States, the most widely distributed is the Guatemalan variety Hass avocado.

## Guatemalan

The Guatemalan variety has a “warty” peel that can vary in thickness. It is green and blackish and shaped like a pear, with a body size that varies greatly, ranging from 140 to 2300 g.<sup>2</sup> This variety does not have an odor.

## Mexican

The Mexican variety is smoother than the Guatemalan and has a fine peel. It is black and weighs 140 to 500 g, including the seeds. This variety smells like licorice when it is ripe.<sup>2</sup>

## West Indian

The West Indian variety generally has a smooth, leathery surface and has a wide range of colors, including red. It weighs 500 to 2300 g. This variety does not have an odor.<sup>2</sup>

## Persin

So why do birds get their feathers in a “bunch” when they eat avocado? The clinical signs of avocado toxicosis are caused by the fat-soluble compound persin (FIGURE 1). Similar to a fatty acid, this unsaturated diene (a compound that has two double bonds between carbon atoms) is a fungicidal toxin.<sup>3</sup> It is harmless to humans, but even a small amount can be dangerous when a bird consumes it. Persin is found in all parts of avocados and in the bark and leaves of their tree. When the fruit ripens and is harvested, persin undergoes progressive enzymatic destruction, which gradually decreases its level.<sup>4</sup>

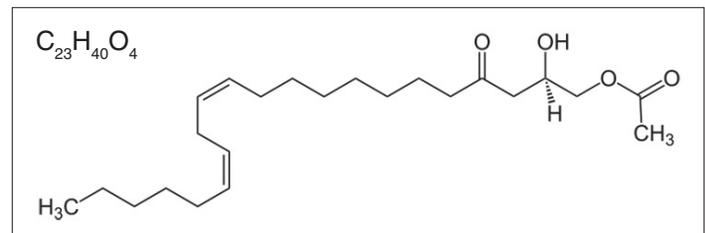


Figure 1. The chemical structure of persin.

## Clinical Signs

Most birds weigh between ~10 g (e.g., zebra finch) and ~1500 g (~3 lb; e.g., green-winged macaw). Here are some lethal doses of fresh avocado in various birds<sup>5</sup>:

- Median lethal dose (LD<sub>50</sub>) in budgerigars: ~2 g
- 100% lethal dose (LD<sub>100</sub>) in budgerigars: ~3.5 g in an average 35-g bird
- LD<sub>100</sub> in cockatiels: ~20 to 30 g
- Minimum lethal dose in canaries: ~2 g

The adverse effects of avocado in birds have been seen as quickly as 15 to 30 minutes after ingestion, but the effects may be delayed up to 30 hours. A wide range of clinical signs has been seen in birds. The first signs that owners usually see are weakness and depression. Affected birds may show disordered plumage and a reluctance to perch (e.g., sitting on the bottom of the cage). Affected birds may also develop dyspnea. Once respiratory signs start, death usually follows quickly<sup>1</sup>; birds with respiratory signs should be kept comfortable, warm, and calm. If the exposure is discovered quickly (within 2 hours of ingestion), the bird should be taken to a local veterinarian for crop lavage and administration of activated charcoal.<sup>5</sup>

Handling can increase stress in birds and aggravate clinical signs of intoxication. Therefore, a bird's total time in hand should be limited during a physical examination. Birds should be captured quickly but gently from their cage or enclosure. When possible, it is often easier and safer to place the cage on an examination table. Everything needed for an examination should be displayed within arm's reach before capturing a bird. One person should be ready to turn off the room light and another person ready to capture the

bird. (The light can also be left on according to personal preference.) As soon as the light is turned off, the bird should be captured quickly, with or without a towel, before the bird can acclimate to the darkness.

Once a small bird is captured, it should be held in dorsal recumbency with its head between the examiner's middle and index fingers. The thumb and little finger should hold the bird's body without restricting breathing; because birds do not have a diaphragm, pressing on their sternum can cause respiratory distress and death. This handling technique is not very effective for large birds such as parrots. Large birds should be restrained by placing one hand around the back of the head. The examiner's fingers should be placed just under the bird's head to help prevent biting. The other hand should restrain the wing and feet. The sternum should never be restricted.<sup>6</sup>

### Treatment

If early decontamination is possible, the best method is crop lavage followed by a dose of activated charcoal using a gavage tube. The bird may be sedated using gas anesthesia and an endotracheal tube placed in the trachea to help prevent aspiration. Once either a ball-tipped, metal feeding tube or a red-rubber feeding catheter is properly placed in the crop, it should be flushed with 10 to 20 mL/kg of warm saline, massaged gently to break up the ingested material, and then aspirated.<sup>7</sup> This process can be repeated as needed. The bird should be restrained properly and cradled as vertically as possible.

After removal of as much avocado as safely as possible, activated charcoal should be given orally at 1 to 3 g/kg (1 to 3 mg/g) of body weight. Because it is currently unknown whether persin undergoes enterohepatic recirculation, activated charcoal can be repeated every 6 to 8 hours, but this should be considered on a case-by-case basis.<sup>1</sup> Activated charcoal binds toxins in the gastrointestinal (GI) tract and prevents absorption into the systemic circulation. For toxins that can be enterohepatically recirculated, when the entire toxin is not absorbed by activated charcoal, the toxin can reenter the system from the liver and return to the GI tract. Because activated charcoal that stays in the GI tract too long may release the toxin, administering a cathartic agent such as sorbitol can be useful. This is contraindicated in dehydrated birds, however, because it may lead to diarrhea and further dehydration.

If clinical signs have already started, decontamination is no longer indicated. The bird's cardiovascular system should be monitored very closely. Cardiac monitoring should include electrocardiography, blood pressure measurement for hypotension, and echocardiography. Pericardial effusion may cause cardiac tamponade, which may be seen on an electrocardiogram. A blood chemistry profile and electrolyte levels should also be obtained. Due to the small size of most avian species, their blood volume

should be considered before blood withdrawal. The blood volume of birds is approximately 10% of their body weight. The amount of blood that can be collected safely from a healthy bird is approximately 1% of body weight. For ill patients, a smaller amount should be collected.<sup>8</sup> An appropriate crystalloid or colloid fluid should be provided.<sup>9</sup> Basic critical care techniques, similar to those used in dogs and cats, should be employed. Having an incubator with oxygen support is recommended.

### Prognosis

In one study, birds were given controlled amounts of avocado.<sup>5</sup> Six of eight budgerigars and one of eight canaries died within 24 to 47 hours after exposure. The prognosis of birds that have ingested avocado depends on how quickly treatment is administered. If no treatment is provided, death is likely.

### Necropsy

Necropsy can help confirm or identify the cause of death. After death, a bird's entire body should be refrigerated in a sealed plastic bag with proper identification (e.g., name, date). It should not be kept in a freezer because the temperature will damage tissue. When the specimen is sent to a diagnostic laboratory, a complete medical history, including the clinical signs and when they appeared, should be provided. Necropsy should include gross and histologic examinations. Postmortem findings have included subcutaneous edema, hydropericardium (i.e., excessive fluid buildup in the pericardial cavity), and generalized congestion of the respiratory and cardiac systems.<sup>5</sup> Exotic species should be submitted only to a pathologist familiar with their unique anatomy and diseases. The above findings support a diagnosis of avocado toxicosis.

### References

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**1. Which variety of avocado is most widely sold in the United States?**

- a. Mexican
- b. West Indian
- c. Guatemalan
- d. none of the above

**2. Which type of toxin is persin?**

- a. bacterial
- b. fungicidal
- c. cytotoxic
- d. neurotoxic

**3. Which of the following may be an initial sign of avocado toxicosis in birds?**

- a. feather picking
- b. abnormal stools
- c. anorexia
- d. disordered plumage

**4. If decontamination is possible, which of the following should be used for crop lavage?**

- a. a ball-tipped, metal feeding tube
- b. a hose and a pump
- c. a straw and your mouth
- d. finger extraction

**5. Which dose of activated charcoal should be given after crop lavage?**

- a. 1 to 3  $\mu$ g/g
- b. 1 to 3 mg/g
- c. 1 to 3 g/ $\mu$ g
- d. 1 to 3 g/mg

**6. What is the median lethal dose of avocado in budgerigars?**

- a. ~1 g
- b. ~2 g
- c. ~3 g
- d. ~4 g

**7. How soon after ingestion is it best to perform crop lavage?**

- a. <2 hours
- b. <4 hours
- c. <6 hours
- d. <8 hours

**8. Which part of a bird's body should never be restricted during handling?**

- a. the back of the neck
- b. the sternum
- c. the wings
- d. the legs

**9. Which compound in avocado causes a toxic reaction in birds?**

- a. pantothenic acid
- b. vitamin K
- c. potassium
- d. persin

**10. Which is a suggested cathartic agent for gastrointestinal decontamination?**

- a. magnesium citrate
- b. magnesium sulfate
- c. sodium sulfate
- d. sorbitol