Teflon Toxicity (PTFE Toxicosis) in Birds: Signs and Prevention

Drs. Foster & Smith Educational Staff

Birds are susceptible to a respiratory condition called "teflon toxicity" or "PTFE poisoning/toxicosis." Deaths can result from this condition, which is due to the noxious fumes emitted from overheated cookware coated with polytetrafluoroethylene (PTFE). This chemical is found on most non-stick cookware and appliances, some stain repellant products, and other household items.

What are the signs of PTFE toxicosis?

The signs of PTFE toxicosis are non-specific, and could be seen in a variety of respiratory and other diseases. Birds are usually found dead in the cage or gasping for air and eventually dying. Mild exposures may result in difficulty breathing, wheezing, incoordination, weakness, depression, anxious behavior, or seizures.

The diagnosis of PTFE poisoning is usually made through physical examination, a history of using an item with a non-stick surface that was possibly overheated, and, if the bird has died, a post-mortem examination. The toxic particles released by overheated PTFE mainly affect the lungs. On post-mortem examination, the lungs are often dark red in color, with hemorrhages and congestion. Hemorrhages and congestion may also appear in the trachea and bronchi. These changes are not specific to PTFE toxicosis, but occur with many types of lung irritants, so there is no way PTFE toxicosis can be positively identified. Other toxic irritants include aerosol sprays, tobacco smoke, carbon monoxide, natural gas, ammonia, and burned foods and cooking oils. The signs associated with exposure to these toxins vary from mild chronic pneumonia to acute death.

The overheating of PTFE has been found to cause lung problems, not only in birds, but also in rats and humans. In people, the disease has flu-like symptoms and is known as "polymer fume fever." It is rarely fatal, although it can cause serious illness, especially in people with underlying respiratory disease.

Why are birds more sensitive to PTFE toxicosis?

The respiratory tract of birds is extremely sensitive to toxins in the air because of its unique anatomy. It is extremely efficient in exchanging gasses in order to provide very high levels of oxygen to the muscles for flight. While delivering oxygen so efficiently, it can also deliver toxic gasses. In addition, the small size and high metabolic rate of birds increases their susceptibility to airborne toxins. Birds, often canaries, have historically been utilized as sentinels for toxic gasses in coal mines because of this increased sensitivity.

To what temperature must PTFE be heated to be toxic?

Under normal cooking conditions PTFE-coated cookware is stable and safe. Many studies have found that PTFE-coated pans must be heated to above 536°F to release toxic particles and fumes, in a reaction called “pyrolysis.” This is a very high temperature, and is rarely reached during normal cooking. Most cooking in PTFE-coated cookware is performed at temperatures between 250° and 400°F. On the other hand, if a PTFE-coated pan is allowed to boil dry or an unfilled pan is heated on HIGH, toxic fumes can result. PTFE-coated drip pans (pans under the burners) will reach over 600°F or higher within minutes during normal use because of their close proximity to the heating element of the burner. Never use PTFE-coated drip pans in a household with birds.

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After "Teflon" or other non-stick surfaces are scratched or tainted in any way, they are more susceptible to breakdown at lower temperatures. There have been reports of some instances of toxicity at lower temperatures.

What products may have PTFE?

Product brand names containing PTFE include non-stick Teflon, SilverStone, Supra, Calphalon, All-Clad, Circulon, Emerilware, Farberware, Meyer, KitchenAid, Krups, and George Foreman. The stain repellants StainMaster and Scotchgard also contain PTFE.

Silicone-coated brand name cookware such as Baker's Secret and EKCO, will not produce toxic fumes, and are considered safe. Because cookware and appliance manufacturers are not required to label their products with warnings or composition statements, contact the manufacturer if there is any question about any item that will be heated or is heat-producing.

Some Common Sources of PTFE

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Non-stick pots, pans, and other cookware
Stain repellants
Space heaters and heat lamp covers
Non-stick irons and ironing board covers
Hair dryers
Non-stick oven drip pans and broiler pans
Non-stick griddles, woks, waffle makers, electric skillets, tortilla presses
Non-stick hot air corn poppers, coffee makers, bread makers
Non-stick slow cookers, roasters, pizza pans
Ceramic cooking stoves

How can PTFE toxicosis in birds be prevented?

Paul M. Gibbons, DVM, of the Niles Animal Hospital and Bird Medical Center in Niles, Illinois makes the following recommendations:

1. If you have PTFE-coated drip pans, throw them away.
2. Never boil water in a PTFE-coated pan.
3. Never leave the kitchen when a PTFE-coated pan is in use.
4. Cook at low or medium heat when using PTFE-coated pans.
5. Use a culinary thermometer to determine the temperature at which your PTFE-coated appliances (deep fryers, waffle makers) operate.
6. Never allow anyone to use PTFE-coated cookware in your home, unless instructed of its potential danger.
7. Ensure that your kitchen is properly ventilated, preferably by a hood that vents outdoors.
8. If you are an absent-minded person: give your PTFE-coated cookware away.

Even if you do all of the above, never keep your pet bird in the kitchen.

What other toxic fumes or gasses pose a danger for birds?

- Carbon monoxide is an invisible, tasteless, non-odorous gas that can be fatal to birds and all other animals. It can be emitted from fires, automobile exhaust, and central heating units. Carbon monoxide detectors for the home are available and should be used. Be sure to place one in the room in which your bird is located.
- Overheated or burned cooking oil, fats, margarine, butter, and other foods may create dangerous fumes when cooked on any type of surface heated above 500°F. Never heat butter or oil in a pan on HIGH.
- Using the "self clean" mode of your oven can produce toxic fumes.
- Natural gas in the air from a leak or unlit pilot light can be fatal. Never allow the pilot light of your oven, stove, water heater, or dryer go out. Keep your bird in a well-ventilated area away from sources of natural gas and propane.
- Aerosols from many types of products may contain fluorocarbons and particulates that can be toxic. Avoid the use of hair spray, perfume, spray deodorant, spray-on cooking oil, spray starch, and other aerosols in the same room as, or in close proximity to, your birds.
- Burned or scorched plastics can emit toxic fumes. Use care in the kitchen, in the placement of candles, and using wood stoves and fireplaces to avoid the burning, scorching, or igniting of any plastic products.
- Fumes from cleaning agents such as ammonia and strong bleach can irritate the respiratory system and cause respiratory difficulties.
- Pesticides, in the form of bug bombs, flea and tick foggers, and pesticide strips and sprays, can be very toxic to birds, as well as fish.
- Organic compounds and solvents, such as those found in nail polish remover, mineral spirits, gasoline, glues, paints, and mothballs are hazardous to birds.
- Smoke of any kind, including tobacco smoke, can quickly become toxic to birds, even causing death. Long-term exposure can not only damage the respiratory system, but cause eye and skin problems, as well as increased

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susceptibility to bacterial infections.

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