

Answers to Questions about Teflon Toxicity in Pet Birds

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Due to much recent interest in the toxicity of Teflon⁷ fumes to pet birds, I have decided to focus this month's article on that topic alone. There have been a variety of statements about this toxicant and its relative toxicity to birds. I hope to put a stop to the many rumors and "new" information being passed around. In my search for scientific articles relating to this topic at the University of Minnesota Veterinary Medical Library, I discovered no articles written in the past two years, and very little written in the past five years. To the veterinary medical community, this topic is settled. I hope to satisfy all of your questions with the following literature review, but if any of you have specific questions left unanswered, please call me at (800) 657-4430, or send a fax to (507) 452-8326. I may not answer your question on the spot, but I would be happy to research it for you.

It is saddening to hear of continued avian deaths due to the noxious fumes emitted from cookware coated with polytetrafluoroethylene (PTFE), the polymer that makes up most nonstick cookware such as Teflon⁷, Silverstone⁷, and Supra⁷. All of us are now aware of the potential for these toxic fumes to be produced, but few of us have a true understanding of the precise circumstances under which the fumes are emitted. As early as 1968, a group of scientists working for du Pont, the maker of Teflon⁷, began asking this very question. They studied the effects on rats of two specific chemicals emitted at certain temperatures.¹ They discovered that the "fumes" contained very small particles of a variety of toxins, some of which were toxic to the rats in their study.

The overheating of PTFE has been found to cause lung problems not only in birds and rats, but also in humans.^{1,2,4} In people, the disease is known as "polymer fume fever," and is rarely fatal. The respiratory tract of birds is uniquely sensitive to the products emitted by overheating PTFE because of a bird's unique respiratory system. Evolution has produced a system that is extremely efficient in exchanging gasses in order to provide very high levels of oxygen to the muscles of flight. Birds have traditionally been utilized as sentinels for toxic gasses in coal mines because of this trait. Certainly, then, very small amounts of a variety of air borne toxins can have serious effects on a bird's respiratory system. Examples of such toxins include not only overheated PTFE, but also aerosol sprays, tobacco smoke, carbon monoxide, natural gas, ammonia, and burned foods and cooking oils.⁴⁻⁷ The symptoms associated with exposure to these toxins varies in each case from mild chronic pneumonia to acute death.

The effects of the particles released by overheated PTFE are mainly on the lungs, and are typical of any pulmonary (lung) irritant.³ When a veterinarian performs a postmortem exam on a bird that died acutely, he may suspect PTFE as the cause of death, but he cannot confirm it simply by looking at the lungs. He or she can make a clinical judgement, however, using postmortem findings *and* the history supplied by the owner. In cases where other toxic particles could have been present in the air around the bird, it would be impossible for the veterinarian to distinguish them simply by examining the lungs. If you have had a veterinarian perform a postmortem exam on one of your birds, when reading the report look for terminology like "dark red lungs, pulmonary congestion, hemorrhagic lungs, tracheal mucosal congestion, submucosal tracheal and/or bronchial hemorrhage."

Many studies have been performed to reveal the precise temperature that must be achieved in order to release toxic particles and fumes from PTFE coated pans.^{1,3,5} The reports show very definitely that birds exposed to the fumes from pans heated above 280°C (536°F) will become sick and may die a few minutes to several hours after exposure.^{3,5,8} The research also very

specifically proves that Quail and parakeets show no signs of illness whatsoever when exposed to pans heated to 270°C (518°F).⁵ Keep in mind, these are very high temperatures, and are rarely achieved during normal cooking. PTFE coated drip pans, however, will reach over 750°F during normal use because of their close proximity to the heating element of the oven.⁹ Some normal cooking temperatures are as follows: fried fish fillet, 265°F; fried noodles with fat, 375°F; fried doughnuts, 340°F; fried veal cutlet, 380°F; French fried potatoes, 385°F; and fried eggs, 375°F.⁵ As you can easily see, normal cooking with PTFE coated fry pans *will not* produce fumes that are toxic to birds, but normal cooking with PTFE coated drip pans *will*.⁹

What this means to us is that we must either throw away our PTFE coated pans, or make a promise to ourselves that we will not allow our pans to overheat. My recommendations include: 1) If you have a PTFE coated drip pan, throw it 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, and 8) If you are an absent-minded person: give your PTFE coated cookware away.

***other sources heaters, blow dryers, irons

Silicone coated cookware such as Baker's Secret⁷, and EKCO⁷, will not produce toxic fumes, and are considered **safe**.⁹ Because cookware manufacturers are required to label their products with neither warnings nor composition statements, I recommend that you or I contact the manufacturer if there is any question about your cook ware's composition.

I would like to mention a few possible alternatives to PTFE toxicity when investigating sudden death associated with respiratory disease in pet birds. First, carbon monoxide is produced by combustion from fires, engines, and central heating units. It can be fatal, but causes postmortem findings different from PTFE fumes (e.g., bright red blood and pink or red tissues). Second, burned foods and cooking oil can emit toxic particles and fumes when cooked on any type of surface heated above about 260°C (500°F).⁵ Never put butter or oil in a pan heated on "high," and avoid using the "self clean" mode of your oven.⁷ Third, small amounts of natural gas in the air have caused death in birds. Never let the pilot light of your oven, stove, water heater, or dryer go out, and make sure your birds are in a well ventilated area away from sources of natural gas and propane. Finally, fluorocarbons and particulates from hair spray, perfume, spray deodorant, Pam⁷ cooking oil, spray starch, and other aerosols can also cause respiratory disease and death. Never use aerosol sprays in the same room as, or in close proximity to your birds.

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Carpet Fresh⁷ Toxicity

A case report presented at the 1994 Conference of the Association of Avian Veterinarians implicates Carpet Fresh⁷ by Airwick⁷ as the agent responsible for the death of thirteen small birds including finches, budgies, cockatiels, and doves. The deaths occurred from 1 to 24 hours after the use of the carpet freshener. It was sprinkled on the floor and vacuumed up as recommended on the label. This product is now considered potentially toxic to pet birds, and I recommend that you discontinue its use near birds.