



BACKYARD CHICKEN EGGS IN CALIFORNIA: REDUCING RISKS QUESTIONS AND ANSWERS

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Why be concerned about backyard chickens?

Eggs from backyard chickens that forage on the ground may be contaminated with higher levels of dioxins than eggs from the grocery store. Grocery store eggs are generally from chickens kept in pens or cages without access to soil and are less likely to contain dioxins.

What are dioxins?

Dioxins are a group of highly toxic chemicals. While some are more toxic than others, they all have similar effects on the body. They are created when garbage, plastics, metals, wood, and other materials are burned. Dioxins are also created when certain chemicals, such as wood preservatives, are made and during many industrial activities such as copper smelting. Smaller amounts of dioxins are also produced during forest fires and other natural occurrences. Because dioxins last for many years and can travel long distances in the air, they are found in many places.

How do home-produced eggs become contaminated?

When dioxins are released into the air they land on plants and soil, as well as on buildings, roads, and other structures. Dioxins remain in the soil for decades. Chickens raised on the ground will constantly peck at and eat soil. Dioxins in the soil are eaten by chickens and remain in the fat of the chicken. Eggs produced by these chickens can contain dioxins. Even chickens that forage on soil with very low levels of dioxins may produce contaminated eggs.

What about home-produced fruits and vegetables?

Thoroughly washed fruits and vegetables are safe to eat because dioxins are stored primarily in animal fat. Dioxins are found in meats, fish, and dairy products. Fruits, vegetables, vegetable oil, and nuts contain almost no dioxins.

How can eating home-produced chicken eggs affect my health?

You cannot taste dioxins in contaminated eggs. Eating eggs with dioxins will not make you sick right away. Dioxins stay in the body for a long time; it may take years of eating contaminated eggs to consume enough dioxins to cause any harm. In laboratory studies, feeding animals large amounts of dioxins has led to cancer, decreased weight at birth, birth defects, liver damage, and a lowered ability to fight infections. In human studies, workers who were exposed to high levels of dioxins on the job were found to be at risk for

developing cancer. Although the amounts of dioxins in these studies were greater than what is found in backyard eggs, these studies suggest a health risk for people eating contaminated eggs.

Where has testing been done?

The California Department of Health Services (CDHS) has tested eggs for dioxins at homes in four (mostly rural) areas where local

industries were releasing dioxins into the environment [see Table 1]. These eggs were contaminated with higher levels of dioxins, and residents were advised not to eat eggs from chickens that have contact with the ground.

We have also tested eggs from chickens raised on the ground in a rural area with no known industrial sources of dioxins (Nevada County, CA). The dioxin levels were lower in this area, and a warning was not issued. However, these eggs had dioxin levels that were five times higher than those found in grocery store eggs.

We have not tested other industrial or urban areas in California that may also have been affected by sources of dioxins.



TABLE 1: DIOXIN LEVELS IN CHICKEN EGGS

Area	Were there Industrial Sources of Dioxins?	Number of Locations Sampled	Average Dioxin Level in Eggs in parts per trillion (ppt)	Advisory
Oroville	Yes	36	4.0	Do Not Eat
South of Mojave (next to Mobile Smelting)	Yes	2	3.0	Do Not Eat
Stockton (Boggs Tract)	Yes	5	2.0	Do Not Eat
Rosamond	Yes	4	0.6	Eat only 3-4 eggs/week
Nevada County	No	6	0.15	None
Store-bought Eggs	Yes	7	0.03	None

a) Dioxin levels are per whole egg and are calculated using methods described by the World Health Organization.

What is the estimated cancer risk from eating eggs from chickens raised on the ground?

We estimated cancer risks from eating eggs:

- In Nevada County, California, there are no known industrial sources of dioxins. However, small amounts of dioxin were still found in chicken eggs. We estimate that if 100,000 people ate three to four dioxin-contaminated eggs per week for 70 years, one of those 100,000 would be expected to develop cancer due to dioxins. This cancer would be in addition to the approximately 33% (or one in three) of people who would develop some form of cancer in their lifetime from other causes.
- In areas of Oroville, Boggs Tract in Stockton, and South of Mojave where there are known industrial sources of dioxins and advisories not to eat the eggs, we estimate that if 100,000 people ate three to four dioxin-contaminated eggs per week for 70 years, 10 of those 100,000 might develop cancer due to dioxin. This cancer would be in addition to the approximately 33% (or one in three) people who would get cancer in their lifetime from other causes.

While the risk of developing cancer from eating eggs from chickens raised on the ground is low, it is still somewhat greater than eating store-bought eggs.

How much dioxin is allowed in eggs that are sold?

In the United States, there are no legal limits on dioxin levels in eggs. However, several guidelines suggest levels at which government agencies might take regulatory action:

- The US Food and Drug Administration, in one incident, removed eggs from stores when levels exceeded 1 ppt (in whole eggs).
- In 2003, the European Union set the legal allowable level of egg contamination at 0.33 ppt (in whole eggs).

How can I reduce the health risk from dioxins in backyard chicken eggs?

People who want to continue to eat home-produced chicken eggs from chickens raised on soil can reduce their health risks by:

- **Eating only the egg white:** Dioxin is stored in fat. All of the fat in chicken eggs is in the yolk. Egg whites are fat-free, cholesterol-free, and rich in protein. The egg whites from chickens raised on soil contain no dioxins and are safe to eat. When using eggs in recipes, generally you can use two egg whites in place of one whole egg.

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- **Removing the fat from chicken meat:** The skin of the chicken has high levels of fat. If you continue to eat chicken meat, remove as much of the skin and other sources of fat as possible. Avoid eating chicken livers.
- **Changing your chicken-raising practices:** The best way to lower the dioxin levels in chickens is to keep them in cages above the ground. Several other practices may lower the amounts of dioxins. However, the practices listed below are not as effective as keeping chickens above the ground:
 - **Enclosing chickens in a coop:** Limiting the area where chickens forage by keeping them inside an enclosed pen may reduce their exposure to dioxins. This reduces foraging activity and soil contact.
 - **Having a barrier, such as cement, gravel, or straw, between the chickens and the ground:** This may help to reduce the amount of dioxins in chickens and their eggs. The California Department of Food and Agriculture also recommends this to prevent the spread of infectious diseases in poultry.
 - **Removing backyard dioxin sources:** Remove any wood thought to be treated with pentachlorophenol (PCP) (for example, scrap pieces of telephone poles) or other types of treated wood. Do not burn any treated wood. Ash piles created by burning PCP-treated wood should also be removed. Most land-fills will accept these materials.

Information about Dioxin Testing:

Dioxin testing costs about \$1,000 or more per sample, and many samples need to be taken to understand how much contamination has occurred in an area. One-time funding paid for most of the testing conducted in the four areas of California.

More Dioxin Information:

A technical report on dioxins in home-produced contaminated eggs and soil is available. For a copy, please contact:

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