

Understanding Your Test Results: Lead in Soil and Chicken Eggs

Healthy Soils, Healthy Communities



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Please note: The following excerpts are taken from project reports sent to gardeners from gardens sampled through the *Healthy Soils, Healthy Soils Communities* project, and are shared here for general use. Please visit <http://cwmi.css.cornell.edu/healthypoils.htm> for more information or contact Hannah Shayler, Extension Associate at Cornell University, by phone at 607-245-2377 or by email at has34@cornell.edu.

Project Information

Urban community gardens bring many benefits to gardeners and their communities, including nutritious and affordable food. In addition to growing fresh fruits and vegetables, some urban gardeners are raising chickens for their eggs, which are a nutrient-dense source of protein that can be part of a healthy diet.

However, urban soils can contain chemicals from years of human activity. In 2009, GreenThumb began a partnership with Cornell University, Cornell University Cooperative Extension-NYC (CUCE-NYC), and the New York State Department of Health (NYSDOH) to test some garden soils and help provide information about chemicals in urban community gardens.

One chemical often found in soil is **lead**. Lead occurs naturally in the environment, but it often occurs at higher levels in soils affected by human activity. Exposure to lead can be associated with health effects (see **Resources** section at the end of this letter for more information). Gardening may increase your contact with lead if you swallow soil particles, track soil into your home, or eat vegetables grown in the soil. Lead in soil can pose a health concern, especially for young children. Lead can harm a young child's growth, behavior, and ability to learn. Lead in soil can pose some risks even if test results are below guidance values.

Did you know...?

- New York State requires health care providers to test all children for lead in their blood when they are one and two years old.
- Parents can also ask their child's doctor or nurse if their child should get a blood lead test, and what the lead test results mean.
- You can find more information about lead and how to prevent lead poisoning by visiting the New York State Department of Health's web site at <http://www.health.ny.gov/environmental/lead/>

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Notes on Recommendations for Chicken Run Soils and Chicken Eggs

- When reading the following **Recommendations** pages, keep in mind that there are no health-based standards specifically for chemicals in community garden soils.

Our project compared lead levels in chicken run soil to typical “background” levels of lead found in rural soils. We also compared soil results to guidance values based on soil cleanup objectives that New York State uses for contaminated sites. These background levels and guidance values are not fixed limits above which there is a concern. Rather, they help identify levels that may call for additional steps to reduce potential exposures.

- There are also no health-based standards in the U.S. specifically for lead in chicken eggs.

Our project compared the lead levels we found in New York City community gardens to levels we found in store-bought eggs and eggs from chickens raised in a rural setting. We also compared them to levels the U.S. Food and Drug Administration (US FDA) reported in boiled store-bought eggs, and to the results from similar scientific studies.

For reference, we also compared the egg results to the only guideline related to lead in food in the U.S., which is the US FDA’s recommendation that lead levels in candy not exceed 0.1 parts per million (ppm).¹ Overseas, the European Commission has set the maximum permissible level of lead in some solid foods between 0.10 and 0.30 ppm,² but none of the European standards applies specifically to eggs. We can consider the US FDA’s recommendation and the European standards as guidelines to give us a frame of reference to help identify levels that may call for additional steps to reduce potential exposures.

¹ U.S. FDA. Guidance for Industry: Lead in Candy Likely To Be Consumed Frequently by Small Children: Recommended Maximum Level and Enforcement Policy. Revised Nov. 2006.

² European Commission Regulation (EC) No 1881/2006.

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Recommendations: Chicken Run Soils

1) If the soil lead test result from your chicken run was below Guidance Value I (200 ppm):

No specific practices are recommended to reduce exposure to lead in the area where the soil was tested.

However, it is always good to follow healthy gardening practices! See the enclosed sheet titled *“What Gardeners Can Do: General Best Practices for Healthy Gardening.”*

2) If the soil lead test result from your chicken run was higher than Guidance Value I (200 ppm), but below Guidance Value II (400 ppm):

It is not unusual for lead levels in urban soils to exceed guidance values, and there is no immediate health concern at lead levels in this range. We do not recommend any specific precautions to reduce your exposure to lead in the area where the soil was tested. However, you might **consider adding clean soil** or other clean cover material to your chicken run. This may help reduce the chickens’ contact with and ingestion of soil with lead levels above Guidance Value I.

And remember, it is always good to follow healthy gardening practices! See the enclosed sheet titled *“What Gardeners Can Do: General Best Practices for Healthy Gardening.”*

3) If the soil lead test result from your chicken run was higher than Guidance Value II (400 ppm):

It is not unusual for lead levels in urban soils to exceed guidance values. In most cases there is no immediate health concern, but there may be some increased risk if you or your child has a lot of exposure to soil in your chicken run over a long time. **We recommend following the specific practices in the box below:**

- **Watch children** when they are in the chicken run. Remind them often to avoid touching their mouths after touching the soil in the area.
- Always **wash your hands** after contact with soil in the chicken run, and have children who play or work there wash their hands. Consider wearing gloves.
- **Avoid bringing chicken run soil into your home** by removing soil from your garden tools and changing your shoes before going indoors.
- **Add clean soil, mulch, or other clean cover material** to your chicken run. This may help reduce chickens’ contact with and ingestion of lead in soil.
- **Discourage chickens from eating soil** that has higher levels of lead, or where lead levels are not well characterized. Avoid scattering feed, including scratch grains and food scraps, on bare ground in these areas. Provide chickens’ regular feed, grit and calcium supplements in feeders.

And remember, it is always good to follow healthy gardening practices! See the enclosed sheet titled *“What Gardeners Can Do: General Best Practices for Healthy Gardening”* for more information.

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Recommendations: Chicken Eggs

Please refer to your test result sheet as you read through the following recommendations to see which ones apply to your garden:

1) If the level of lead in all eggs collected from your garden was less than 0.02 ppm:

The level of lead in eggs collected from your garden was similar to or only slightly higher than the levels found in store-bought eggs and eggs from a rural location.

We do not have any specific recommendations based on the results of the egg testing. However, you should still follow any recommendations related to your soil testing results. And **it is always good to follow healthy gardening practices**, like the ones described in the enclosed sheet (*“What Gardeners Can Do: General Best Practices for Healthy Gardening”*).

2) If the highest level of lead in eggs collected from your garden was between 0.02 and 0.10 ppm:

One or more eggs collected from your garden had a higher level of lead than levels found in store-bought eggs and eggs from a rural location. At typical rates of consumption (two to three eggs a week for a young child), and even at a more frequent consumption rate of one egg per day, the increase in lead exposure from eggs in this range should not pose a significant health risk.

We do not have any specific recommendations based on the results of the egg testing. However, if you are concerned about your eggs' having lead levels higher than store-bought or rural eggs, you can consider taking steps to reduce your chickens' exposure to lead in soil, like those described in the box on the next page. You should also follow any recommendations related to your soil testing results. And **it is always good to follow healthy gardening practices**, like the ones described in the enclosed sheet (*“What Gardeners Can Do: General Best Practices for Healthy Gardening”*).

3) If the highest level of lead in eggs collected from your garden was between 0.10 and 0.30 ppm:

One or more eggs collected from your garden had a higher level of lead than levels found in store-bought eggs and eggs from a rural location, and higher than one of the food guidelines we used for reference.

While eating eggs with lead levels in this range could increase your exposure to lead, at typical rates of consumption (two to three eggs a week for a young child), the increase in lead exposure from eating eggs in this range should not pose a significant health risk. However, there could be some increased risk for a child who frequently eats eggs with lead levels in this range – an egg a day, for instance, over a long period of time. Because the highest level of lead found in eggs from your garden was in this range, you should consider following the practices in the box below:

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To reduce your exposure to lead in chicken eggs:

- **Remove dust and soil from eggshells** before preparing eggs.
- Lead may accumulate more in egg yolks than in egg whites. **Consider serving fewer egg yolks**, especially to young children.

To reduce chickens' exposure to lead:

- **Evaluate your garden for potential sources of lead. Do not allow your chickens to forage in these areas.** For example, keep chickens away from structures painted with lead-based paint and out of areas where the soil has higher levels of lead.
- **Avoid feeding your chickens unwashed garden scraps** from areas where the soil has higher levels of lead.
- Consider **adding clean soil, mulch, or other clean cover material** if lead levels in your chicken run soil are above guidance values. This may help reduce chickens' contact with and ingestion of lead in soil.
- **Discourage chickens from eating soil** that has higher levels of lead, or where lead levels are not well characterized. Avoid scattering feed, including scratch grains and food scraps, on bare ground in these areas. Provide chickens' regular feed, grit and calcium supplements in feeders.

Also, remember to follow any recommendations related to your soil testing results. And **it is always good to follow healthy gardening practices**, like the ones described in the enclosed sheet ("*What Gardeners Can Do: General Best Practices for Healthy Gardening*").

Resources

- Agency for Toxic Substances and Disease Registry ToxFAQs™ - Information about contaminants: <http://www.atsdr.cdc.gov/phs/phs.asp?id=120&tid=25>
- Cornell Waste Management Institute fact sheets and other *Resources for Healthy Soils*: <http://cwmi.css.cornell.edu/soilquality.htm>
- NYSDOH brochure on Healthy Gardening: <http://www.health.ny.gov/publications/1301/index.htm>
- NYSDOH Environmental Laboratory Approval Program (ELAP) list of certified laboratories: <http://www.wadsworth.org/labcert/elap/elap.html>
- NYSDOH Lead Poisoning Prevention website: <http://www.health.ny.gov/environmental/lead>
- U. S. Environmental Protection Agency information about Brownfields and Urban Agriculture: <http://www.epa.gov/brownfields/urbanag/>
- Agro-One Services - Testing for soil pH and fertility: http://www.dairyone.com/AgroOne/Form_H_Lawn_Garden_Landscape

What Gardeners Can Do: Best Practices for Healthy Gardening

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General Best Practices for Healthy Gardening

- **Add clean soil and compost.** Consider having these materials tested by a NYS-certified laboratory. **Use raised beds if appropriate for your garden.** Incorporate new compost or other organic material often.
- **Avoid use of railroad ties, telephone poles, pressure-treated wood and previously painted wood** to build your beds because they contain chemicals that can migrate into soil.
- Maintain a **good soil nutrient balance** and a **pH near neutral**.
- **Cover (or mulch) soil in beds and in non-growing areas** such as pathways to reduce children's exposure to soil, and to reduce soil splash, dust and tracking of soil home. Different materials can be used such as stones or wood chips for paths, and compost or dried leaves for beds.
- **Create a barrier to separate underlying soil from children's play area surfaces.** Consider laying down landscape fabric (or other durable material) and put clean play materials such as sand or wood chips on top. **Check the barrier** over time to be sure underlying soil isn't mixing with play materials.
- Always **wash your hands** after gardening, and have children who play or work in the garden wash their hands. Consider also wearing gloves while gardening.
- **Avoid bringing soil into your home** after gardening by removing soil from your garden tools and harvested vegetables while at the garden and changing your shoes before going indoors.
- **Thoroughly wash and/or peel garden produce.** This is especially important for leafy and root vegetables, which are more likely to have soil particles on their surfaces.

Consejos generales para practicar la jardinería de manera saludable. Lo que los jardineros podemos hacer...

- **Agregar suelo y composta limpios.** Si es posible, haga analizar estos materiales por un laboratorio certificado por el estado de Nueva York. Si cultiva verduras en su jardín, trate de hacerlo en camas (arriates/canteros) y agrégueles frecuentemente composta o materia orgánica.
- **No usar durmientes de tren, postes de teléfono, madera tratada o madera que haya sido pintada** para construir las camas porque la madera puede contener sustancias químicas que pueden pasar al suelo.
- Mantener los **nutrientes del suelo bien balanceados** y un **pH cercano al neutro**.
- **Cubrir con astillas de madera "mulch"**, tanto las camas como los andadores y otras áreas donde no se cultivan verduras para disminuir el contacto de los niños con el suelo, reducir las salpicaduras y la cantidad de polvo que se lleva a la casa. También puede usar materiales como grava y piedrecillas para cubrir los andadores y composta u hojas secas para las camas.
- **Colocar una barrera para separar el suelo por debajo de las áreas de juego de los niños.** Puede cubrir el suelo con tela de las que se usan en jardinería (u otro material durable) y colocar encima arena o pedacera de madera limpios. **Revise de vez en cuando la barrera** para asegurarse de que el suelo por debajo no se ha mezclado con los materiales de juego.
- **Lavarse las manos siempre después de trabajar en el jardín** y procurar que los niños que juegan o trabajan en el jardín hagan lo mismo. Considere usar guantes mientras trabaja en el jardín.
- **Evite llevar suelo del jardín a su casa** sacudiendo las herramientas y raíces cosechadas mientras está en el jardín y cambiándose los zapatos antes de entrar a la casa.
- **Lavar muy bien y/o pelar las verduras del jardín.** Esto es especialmente importante en el caso de vegetales con hojas anchas o aquellos que crecen enterrados, de los cuales es más difícil eliminar las partículas de tierra.