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Treated Wood in the Garden

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Raised beds have become a popular way of modern gardening with limited space. Materials of choice to construct these beds include pressure-treated lumber and old creosote-treated cross ties. Even outdoor planters are made with pressure-treated lumber. The National Organic Program Part 205.206 f clearly states, "The producer must not use lumber treated with arsenate or other prohibited materials for new installations or replacement purposes in contact with soil or livestock." Should gardeners and others who have used treated lumber in the past be concerned? Is the modern, treated lumber available at the local home improvement store safe to use in the garden? The following information summarizes the research behind some of these concerns and in general, emphasizes the safety of modern pressure-treated lumber products.

Most wood sold for outdoor use in the United States between 1975 and 2003 was pressure treated with chromated copper arsenate (CCA). (www.dec.ny.gov).

The United States Environmental Protection Agency (USEPA) has not concluded that CCA-treated wood poses any unreasonable risk to the public or the environment. However, one of the components of CCA-treated wood, arsenic, is a known human carcinogen. Therefore, any reduction in the levels of potential exposure to arsenic is desirable. (www.dec.ny.gov)

Studies have shown that CCA-treated lumber does leach chromium, copper and arsenic into the surrounding soil. The migration of these elements appears to be limited to a few centimeters adjacent to the lumber. In addition, research has not clearly shown a long term negative impact upon plants or animals. (www.dec.ny.gov)



A raised bed garden using pressure-treated lumber.
(Image from ANR-1345, "Raised Bed Gardening")

Homeowners Cannot Purchase CCA-Treated Lumber Today

Because CCA-treated lumber is not readily available to the homeowner anymore, there really is no reason for concern. On February 12, 2002, the United States Environmental Protection Agency (USEPA) announced a voluntary decision by industry to move consumer use of treated lumber products away from a variety of pressure-treated wood that contains in favor of new alternative wood preservatives. This transition affected virtually all residential uses of wood treated with CCA, including wood used in play-structures, decks, picnic tables, landscaping timbers, residential fencing, patios and walkways/boardwalks. As of January 1, 2004, USEPA did not allow CCA products to be used to treat wood intended for any of these residential uses. The remaining stock of CCA-treated lumber was sold out in most stores by the fall of 2004.

Risks Associated with old CCA treated lumber

Chromated copper arsenate (CCA) is a chemical wood preservative containing chromium, copper and arsenic. CCA is used in pressure-treated wood to protect wood from rotting due to insects and microbial agents. EPA has classified CCA as a restricted use product, for use only by certified pesticide applicators. In its risk assessments, the Agency identified risks of concern associated with occupational exposure (i.e., treatment plant workers) to all three preservatives and ecological exposure to pentachlorophenol and creosote.

Pressure-treated lumber has been preserved using CCA since the 1940s. Since the 1970s, the majority of the wood used in outdoor residential settings has been CCA-treated wood. Pressure-treated wood containing CCA is no longer being produced for use in most residential settings, including decks and playsets. The Agency has completed its reregistration eligibility decision (RED) and will continue to work with stakeholders to implement its decision. Pesticide manufacturers voluntarily phased out certain CCA uses for wood products around the home and in children's play areas. Effective December 31, 2003, no wood manufacturer may treat wood with CCA for residential uses, with certain exceptions. (www.epa.gov)

Arsenic and Cr compounds used as wood preservatives are Restricted Use Pesticides specified for commercial pressure treatment applications only. However, there is very little chance that these compounds, even if leached into the soil, would be taken up by plants and consequently harm the ecosystem. USDA heavy metals expert Rufus Chaney mentioned that what constitutes an acute toxic dose of these toxic compounds is not relevant to gardeners.

Some facts have been pointed out regarding leaching issues of CCA in the magazine Fine Gardening. It clearly states that chemicals from CCA-treated wood have an overall good resistance to leaching with only minimal loss of chemicals. In a study with utility poles of various ages Paul Cooper of University of New Brunswick, Canada, found uniformly high retention with some initial leaching during the first rain of the year. After some time, the wood settled down with leaching decreasing over time. The leaching was most pronounced at an acidic pH of less than 3 which is quite unsuitable for growing crops. Hence uptake by crops should not be an issue with CCA-treated wood. This study also found no evidence of As mobility in the soil following leaching. According to Stan Lebow, a wood scientist at the USDA Forest Product Laboratory in Madison, Wisconsin, the CCA compounds cannot move long distances in the soil and hence their potential to leach into the groundwater is essentially zero (Kitchen Gardener 15, 55-59). The amount of As leaching from CCA-treated woods varies considerably and depend on various factors like local climate, acidity of rain and soil, age of the wood product, and how much CCA was applied (www.epa.gov).

However, burning of CCA-treated wood can cause concerns. Burning sends some of the As up in smoke, which can be inhaled. The ash is also a source for As compounds (Kitchen Gardener 15, 55-59; www.epa.gov).

If you still have some old CCA-treated lumber around and would like to use it, here are some things that can be done to CCA-treated woods to minimize leaching:

- (1) Scrubbing the wood with detergent or power washing it will remove surface residues.

- (2) The boards should be left to weather several months before they are cut, drilled and assembled. Studies have shown that the greatest amount of leaching takes place during the first rainy season.
- (3) Predrill holes for screws to prevent making cracks in the wood. Cracks are places from where leaching can initiate.
- (4) Lining the inside of the bed with heavy duty plastic before filling it will create a physical barrier to any CCA compounds moving into the soil.
- (5) Painting exposed wood surfaces with paint or water repellent finish will also prevent skin exposure to the CCA compounds.
- (6) Avoid growing root crops close to CCA-treated woods.

(<http://www.finegardening.com/design/articles/pressure-treated-wood-in-beds.aspx>)

In essence to be safe from environmental impacts of CCA-treated woods the following steps can be taken:

- (1) Pressure-treated lumber containing CCA compounds should never be used in vegetable gardens.
- (2) Soils that are acidic and sandy are more likely to leach heavy metals from pressure-treated lumber.
- (3) Phosphate addition will enhance the ability of the plant for As and Cr uptake.
- (4) Addition of compost to CCA contaminated soils can help to bind As and Cr and thus reduce plant uptake.

Alternatives Available to the Gardener

Because CCA-treated lumber is not readily available to the homeowner anymore, there really is no reason for concern. There are many types of less toxic alternatives to CCA-treated wood such as plastic lumber, metal, wood which is naturally resistant to insects and decay and wood that is pressure treated with less toxic ingredients.

- Plastic lumber is an increasingly popular building material. Plastic lumber, which is most frequently composed of high density polyethylene (HDPE), does not release hazardous materials into the ground. An additional benefit of using this material is that it is often manufactured with recycled plastic. Therefore, using plastic lumber conserves natural resources. In addition, plastic lumber usually requires less maintenance.
- Composite lumber - Wood and plastic combined into one lumber product is called composite lumber. Wood/plastic composites generally exhibit low moisture absorption and high resistance to decay, insect, and UV ray damage. The wood component provides the composite with greater dimensional stability than plastic lumber, but not as much as wooden lumber. Like plastic-only lumber, wood/plastic composite lumber is often made with recycled materials.
- Metal-constructed playground equipment is another option for a durable non-polluting structure.
- Naturally decay-resistant wood offers another alternative to CCA-treated wood. Untreated wood such as redwood, cedar, cypress and teak contain natural wood preservatives which protect the wood from decay.
- Lumber pressure treated with non-arsenic wood preservatives is available in the marketplace. Many of these wood preservatives are copper-based such as ACQ (ammoniacal copper quaternary) compound or CA (copper azole). For additional information about alternatives to CCA-treated lumber, visit USEPA's CCA website or contact your local hardware store or lumberyard.

Creosote-Treated Wood

Some woods are treated with creosote, a product derived from coal. Creosote is obtained from high temperature distillation of coal tar. It is essentially a mixture of many organic substances. Creosote consists primarily of polycyclic aromatic hydrocarbons (PAHs). It is a restricted use pesticide and toxic. That is why it is such a good wood preservative. Creosote can volatilize into the air, especially during hot weather, and plants growing in the vicinity may be damaged from the vapors. It can also leach into soil, but it is rarely absorbed by plant roots and therefore not taken up by the plant. Coal tar creosote components that dissolve in water may move through the soil into groundwater. The breakdown of creosote components in water may take years. Breakdown in soil can take months for some components or much longer for others. Fresh creosote-treated wood should never be used



Raised beds bordered with very old, highly weathered, creosote-treated cross ties.

in interior locations like greenhouse, because the enclosed vapors can damage and kill the plants. Creosote can build-up in plants and animals; however, the rate of uptake in plants is very small (less than 0.5% of the total available creosote). As a result, uptake of creosote by humans is also miniscule (Tripathi, R.K., Virginia Department of Health, 2000).

Creosote has been identified in a variety of environmental media including surface water, groundwater, soil, and sediment collected at 46 of the 1613 EPA NPL hazardous waste sites. Coal tar creosote compounds are slowly released from the surface of treated wood products by oil exudation, leaching by rain water, or volatilization. Losses of creosote from impregnated wood are dependent on the kind of coal used to produce the coal tar, the conditions under which the wood is used

kind of coke oven used to make the coal tar, and the conditions under which the wood is used (www.atsdr.cdc.gov).

Many gardeners like to use old, creosote-treated cross ties or utility poles for raised beds and garden borders. Because these items are many decades old, the volatile compounds have already disappeared and any leaching has already occurred. There has been no issue of plant uptake or human health associated with using these old, highly weathered, creosote-treated products in or around the home garden.

Summary

Because the old CCA-treated lumber is no longer available today, some of the old concerns with arsenic and chromium leaching are no longer relevant to the home gardener. New copper compounds in pressure treated lumber are much safer in the environment and pose little risk to human health. There are many alternatives for those gardeners who just feel more comfortable using other materials for their raised beds and planters.



Above photo courtesy of www.homedepot.com