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Preserving Wood and Our Environment

They help your deck and picnic table last for years. They keep the fence around your yard standing tall. They protect the equipment your children play on.

Preservatives are essential to using wood outdoors. Chromated copper arsenate (CCA) has been the overwhelmingly dominant preservative used since the 1970s. But concerns have been raised recently about the safety of CCA-treated wood because it contains arsenic.

As a result of those concerns, a voluntary settlement was reached between the U.S. Environmental Protection Agency (EPA) and the wood-treating industry. Effective December 31, 2003, the use of CCA-treated wood will be limited to certain industrial and commercial applications. It will no longer be approved for residential applications.

Should I be worried about my deck and picnic table?

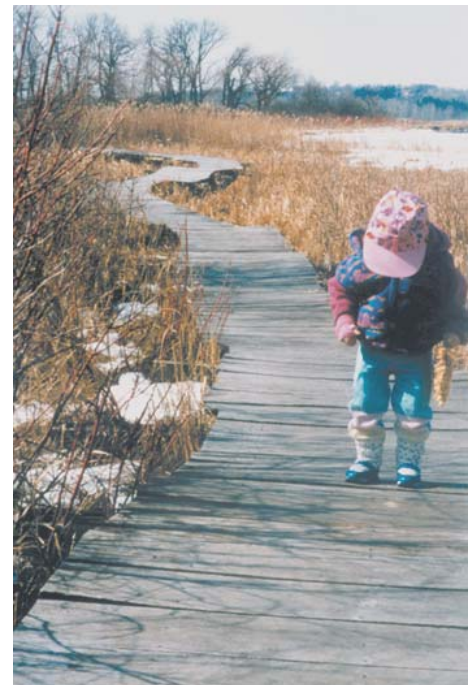
Not necessarily, according to the EPA. The Agency has not concluded that CCA-treated wood poses any unreasonable risk to humans or the environment, nor are they recommending the removal of existing CCA-treated wood structures. But because arsenic is a known human carcinogen, the EPA feels that it is a responsible action to reduce the levels of potential exposure.

If you're concerned about the CCA-treated wood in use around your home, a simple precaution may ease your worries. FPL researchers have determined that coating treated wood will greatly reduce the leaching of preservatives from the wood.

“Common commercial coatings such as latex paint, oil-based paint, and penetrating deck stains will reduce the leaching of chemicals from the wood,” says FPL researcher Stan Lebow.

“Coatings such as varnish will serve the same purpose (*continued on page 3*)

FPL researchers are working to create wood preservatives that are less harmful to the environment.





A New Tool for Tackling Termites

Many homeowners face the challenge of protecting their homes from termites. But a new weapon may soon be available to fight these destructive foes,

thanks to scientists at the Forest Products Laboratory (FPL) and the Agricultural Research Service (ARS).

While researching naphthalenic compounds (substances similar to those found in moth-balls) as a possible wood preservative,

FPL microbiologist Frederick Green made an interesting discovery. Not only did certain compounds protect wood from fungal decay, but they also killed native termite colonies.

Green contacted researchers Guadalupe Rojas and Juan Morales-Ramos of the ARS Southern Regional Research Center (SRRC) because of their expertise in creating termiticides. The researchers incorporated the naphthalenic compounds into a toxic bait that termites like to eat and will therefore spread readily throughout their colonies.

This new termiticide has several advantages over current treatments. It contains no heavy metals and is effective in very low concentrations. It is also very affordable, costing just \$1 per gram. Termiticides that are currently on the market delivering the same results can cost up to \$50 per gram.

A patent application has been filed, and the technology is available for licensing.



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Preserving Wood (continued from page 1) but will be difficult to maintain because of their tendency to blister and peel.”

So what are the other treatment options for wood?

Several alternative wood preservatives are on the market today. Alkaline Copper Quat (ACQ) and Copper Azole (CA-B) are two examples of alternative treatments that are currently available. They have been standardized by the American Wood Preservers' Association, and their use is becoming more common. Although the price of wood treated with these newer preservatives is slightly higher than that of CCA-treated wood, Lebow says ACQ and CA-B are two of the most comparable alternatives.

Another option is to use woods that are naturally decay resistant, such as redwood and cedar. This may be considerably more expensive but serves as an all-natural alternative. However, Lebow cautions that because the durability of these types of wood varies, treated wood should still be used for critical structural supports that contact the ground.

Products such as woodfiber/plastic composites are also making their way into the market. These products can be used like conventional decking lumber and have lasting durability without preservative treatments. However, testing has been minimal on this relatively new product. “While wood-plastic composite lumber is promoted as durable, resistant to cracking and warping, and requiring low maintenance, there is insufficient public technical information available about its long-term durability and service life,” says Jerrold Winandy, Project Leader for the Performance Engineered Composites group at FPL.

What does the future of wood preservatives look like?

Researchers at the Forest Products Laboratory are working to develop future products. Lebow feels some of the alternative preservatives on the market are merely a temporary solution. “Many of the alternatives are copper based, presenting a new environmental concern, as copper is a heavy metal,” says Lebow. “So, eventually, an alternative to these copper-based treatments may need to be found as well.”

He says FPL researchers are now looking to develop preservatives that have fewer adverse effects on the environment. One important step in this process has to do with the way preservation is looked at.

“In the past, preservatives have been a one size fits all type treatment,” says Lebow. “The same preservatives were used in many different applications, which led to some products being treated with some chemicals that were not necessary for their preservation.”

To address this issue, FPL researchers are looking into developing more tailored preservatives. For example, wood slated for in-ground use may be treated differently than wood that will be used in water. Lebow says that by creating different formulas for different products, the total amount of chemicals in the wood would be reduced. This, in turn, would reduce the environmental impact of the preservatives and still allow us to protect our decks and picnic tables.

“Treated wood is a \$4 billion per year industry, serving a very real need for the American public,” says Lebow. “Our research is working to meet that need in a way that is better for the environment.”





Fungi Help Reduce Treated Wood Waste

CCA has been the dominant wood preservative for decades for a simple reason—it works very well. In fact, it works almost too well. Consumers aren't keeping their decks and playground equipment as long as the wood can last, creating a major disposal problem.

Currently, much of the discarded treated wood is sent to landfills across the country. The wood is so well preserved that it doesn't break down in the landfill as well as other disposed items do. And when it does, the chemicals contained in the wood could pose a problem if they leach into the ground water. So, what can we do with all this waste wood?

Barbara Illman, a research project leader at the Forest Products Laboratory, and her team of Vina Yang and Les Ferge have recently been awarded three patents for their work with fungi that could help alleviate this problem.

They have found that naturally occurring fungi can metabolize preservative-treated wood, turning the wood into carbon dioxide while degrading the toxic chemicals. The processes are inexpensive and environmentally benign.

Thus far, they have had the most success with ACQ-treated wood, which is good news since its use will increase once CCA is off the market. "We've been able to degrade about 30 percent of the ACQ-treated wood," Illman says.

If similar results can be obtained for other types of treated wood, this process will be a major step towards reducing the amount of preservative-treated wood in our nation's landfills. ☞

Interior Secretary Gale Norton follows "President's Healthy Forests Initiative" announcement with stop at FPL

Interior Secretary Gale Norton and Rebecca Watson, Assistant Secretary for Lands and Minerals Management, spent an afternoon at the FPL in early September learning about our research on using small-diameter timber. The visit came on the heels of Secretary Norton's and Agriculture Secretary Ann Veneman's joint announcement of how the USDA and DOI would support the President's Healthy Forests Initiative.

After her tour, Secretary Norton said "FPL could play a vital role in helping Interior agencies find uses for some of the material that needs to be thinned from our forests." ☞



From top to bottom: FPL researcher Roger Rowell describes how juniper, a problem species in the Southwest, is ground up and made into filters that absorb a variety of pollutants from contaminated streams; the media interview Secretary Norton about the President's Healthy Forests Initiative; and Technology Marketing Unit (TMU) Program Manager Sue LeVan-Green describes one of the unit's missions: helping rural communities find economical uses for small-diameter timber.



Ask FPL

In the Summer 2002 issue of NewsLine, we addressed the broad topic of mold and mildew. Under the question “How can I discourage mold and decay fungi growth in my home?” we stated that properly ventilated crawl spaces and attics might help keep mold and decay at bay. However, in discussing this issue further with our researchers, it seems that the answer is not black and white. According to Anton TenWolde of FPL’s Advanced Housing Research Center, “the question of whether or not ventilation is appropriate depends on where you live. In cold climates, proper ventilation is very important for this purpose, but in warm climates, this might not be the case.”

TenWolde also offers the following advice on controlling moisture in homes. Most of these tips are from Ten Wolde’s article “Venting of Attics and Cathedral Ceilings” recently published in the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Journal.

TenWolde’s recommendations for new construction:

- Minimize wetting of the building and materials during construction, and dry the building out as soon as possible after enclosure.
- Lead the rainwater away from the foundation by proper site drainage, gutters, and down spouts.
- Provide roof overhangs.
- Provide proper flashing around doors, windows, and any other penetration of the walls, and integrate the flashing with the weather barrier.
- Build airtight by including air barrier systems in the walls and ceiling.
- Provide a ground cover in the crawl space.
- Ventilate bathrooms, kitchens, and clothes dryers to the outdoors.

In cold climates:

- Provide ventilation of the living space, preferably with a dedicated ventilation system.
- Provide attic vents to alleviate problems with ice buildup on the roof.

In warm, humid climates:

- Provide sufficient dehumidification. Residential air-conditioning equipment is often oversized and usually has only a temperature control. Properly (smaller) sized equipment does a better job of keeping humidity in check.
- Avoid the use of low-permeability interior finishes (such as vinyl wall paper), especially when there is a potential for air leakage into the walls from the outside.

For more information, check out our website at www.fpl.fs.fed.us

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Chris Risbrudt
Director

Chief visits FPL

USDA Forest Service Chief Dale Bosworth spent the day at the FPL on September 26 learning more about our research and how we're supporting his management agenda. 

From left to right: FPL researcher Jim Han shows Chief Bosworth how juniper fiber mats can absorb pollution from contaminated streams; FPL Assistant Director Ted Wegner discusses research designed to improve paper recycling rates and lessen the environmental impact of papermaking; and FPL researcher Mandla Tshabalala describes what could be a new design for the juniper water filters.

