



ORGANIC ALTERNATIVES TO TREATED LUMBER

CURRENT TOPIC

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July 2002

INTRODUCTION

This publication reminds all prospective and currently certified organic producers that treated lumber is not allowed under the Final Rule of the National Organic Program (NOP), and provides information on alternative products. For posts and lumber that are in contact with soil, crops, or livestock, the options include untreated lumber, alternatively treated lumber, alternative plywood products, and untreated fence posts. There are also wood treatments that can improve the lifespan of the materials by making them resistant to attacks by insects, fungi, and bacteria that cause deterioration and rot in unprotected wood. Producers will need to work with their organic certifiers to determine which alternative products or treatments are allowed and will work best for their specific operations. For a list of accredited certifying agents, visit <http://www.ams.usda.gov/nop/Accreditation/accreditation.htm>.

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WHAT IS USED IN TREATED LUMBER?

Most treated lumber is preserved with creosote, pentachlorophenol, or chromated copper arsenate. Creosote, a brownish-black oil composed of hundreds of organic compounds and made from coal tar, wood, or petroleum, is a restricted-use pesticide that can volatilize into the air during hot weather, as well as leach into the soil (Hoffman et al., 1995; Public Health Seattle & King County, 2000). Pentachlorophenol (PCP) is a member of the same chemical family as 2,4,5T, and can contain dioxins. Creosote- and PCP-treated woods are mainly used for railroad ties and telephone poles. They should never be used in enclosed areas (MacMillen, 1995; Public Health Seattle & King County, 2000).

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Chromated copper arsenate (CCA) is used in the treated wood—often referred to as “pressure-treated lumber”—most commonly available in retail outlets (Stehouwer, 2001). The CCA mixture, which contains copper, arsenic, and chromium compounds, is dissolved in ammonia and then forced, under high pressure, deep into the wood (Hoffman et al., 1995). According to recent studies, arsenic can be absorbed through the skin on contact with treated wood (Williams, 2002). The results of prolonged exposure to arsenic can include vomiting, diarrhea, nerve damage, blood vessel damage, and heart rhythm dysfunction (Rodale, 2000). Arsenic is also an extremely potent carcinogen, and chromium is a suspected carcinogen (Anon. [Mother Earth News], 2001/2002).

CCA-treated wood is resistant to leaching. However, arsenic, chromium, and copper do leach from the wood. Arsenic can collect in the soil under most CCA-treated wood applications. A 2" x 6" x 12' CCA-treated timber contains an ounce of arsenic; a utility pole can contain 40 pounds of arsenic. Burning the CCA-treated wood volatilizes some of the arsenic, but the ash remaining is technically a hazardous waste. Disposal of CCA-treated wood to landfills may be potentially dangerous because as the wood rots in the landfills the metals are released and may pose a threat to groundwater (Quarles, 2002).

The U.S. Environmental Protection Agency (EPA) has classified CCA as a restricted-use pesticide, but in the past did not restrict the use of CCA-treated wood (Stehouwer, 2001). However, the EPA recently announced that CCA-treated lumber will not be allowed for residential use after December 2003 (EPA, 2002). Additional information on CCA is available from the EPA in their publication *Chromated Copper Arsenate (CCA) and Its Use as a Wood Preservative* available at <<http://www.epa.gov/pesticides/citizens/1file.htm>>.

USDA REGULATIONS

The Final Rule of the National Organic Program (NOP) declares that “*a producer must not use lumber treated with arsenate or other prohibited materials for new installations or replacement purposes in contact with soil or livestock*” (§205.206(f)). This restriction addresses applications such as:

- Lumber used to build a pasture farrowing hut for hogs, a cattle feed bunk, or a shelter for sheep or calves
- Lumber for floors, ceilings, or walls of feed or crop storage areas
- Fence posts in livestock pastures and holding or confining areas
- Posts, plant stakes, trellising, and frames of planting beds used in fruit and vegetable production

Treated-lumber uses that are isolated from organic production—such as wooden building materials that are not in direct contact with either livestock or crops—are not restricted. The Final Rule of the NOP states:

This provision prohibits the use of lumber treated with arsenate or other prohibited materials for new installations or replacement purposes in contact with an organic production site. We included this modification to clarify that the prohibition applies to lumber used in direct contact with organically produced and handled crops and livestock and does not include uses, such as lumber for fence posts or building materials, that are isolated from production. (USDA, 2000, p. 72)

Have any production-isolated uses of treated lumber documented in your Organic Production and Handling System Plan, an outline for which will probably be included in the application packet provided by the certifying agency. The ATTRA publication *Creating an Organic Production and Handling System Plan: A Guide to Organic Plan Templates* discusses the general requirements and includes copies of the plan templates for your use.

The Organic System Plan

The Organic Food Production Act of 1990 (OFPA) requires that all crop, wild crop, livestock, and handling operations requiring certification submit an Organic Production and Handling System Plan to their certifying agent and, where applicable, the State Organic Program (SOP). The organic system plan is a detailed description of how an operation will achieve, document, and sustain compliance with all applicable provisions in the OFPA and the NOP regulations. The certifying agent must concur that the proposed organic system plan fulfills the requirements of subpart C of the NOP Final Rule and any subsequent modification of the organic plan by the producer or handler must receive the approval of the certifying agent.

The organic system plan is the forum through which the producer or handler and certifying agent collaborate to define, on a site-specific basis, how to achieve and document compliance with the requirements of certification. The organic system plan commits the producer or handler to a sequence of practices and procedures resulting in an operation that complies with every applicable provision in the regulations. Accreditation qualifies the certifying agent to attest to whether an organic system plan comports with the organic standard. The organic system plan must be negotiated, enacted, and amended through an informed dialogue between certifying agent and producer or handler, and it must be responsive to the unique characteristics of each operation.

An organic system plan contains six components. First, the plan must describe the practices and procedures used, including the frequency with which they will be used, in the certified operation. Second, it must list and characterize each substance used as a production or handling input, including the documentation of commercial availability, as applicable. Third, it must identify the monitoring techniques that will be used to verify that the organic plan is being implemented in a manner which complies with all applicable requirements. Fourth, it must explain the record keeping system used to preserve the identity of organic products from the point of certification through delivery to the customer who assumes legal title to the goods. Fifth, the plan must describe the management practices and physical barriers established to prevent commingling of organic and nonorganic products on a split operation and to prevent contact of organic production and handling operations and products with prohibited substances. Finally, the organic system plan must contain the additional information deemed necessary by the certifying agent to evaluate site-specific conditions relevant to compliance with these or applicable SOP regulations. Producers or handlers may submit a plan developed to comply with other Federal, State or local regulatory programs if it fulfills the requirements of an organic system plan. (USDA, 2000, p. 41-42)

After speaking with a number of certifiers, it is my understanding that otherwise-prohibited treated lumber installations that already exist on an accredited farm will be allowed to remain, or be “grandfathered in,” by the renewing USDA/NOP accredited certifying agents.

However, it is important to remember that any replacement posts or any facilities built after an application for certification is made must not use prohibited construction materials. The Final Rule of the NOP is very specific when it states:

The replacement of lumber treated with prohibited substances that comes into contact with soil, crops, or livestock under organic management with treated lumber is now specifically prohibited in organic systems. Since the use of lumber treated with prohibited substances for the purpose of preventing degradation is not a common practice in livestock production, this prohibition is not expected to increase producer costs substantially. The exact magnitude of any increase is uncertain and mainly dependent upon the number of producers seeking organic certification that currently use treated lumber in their operations and are planning to replace that lumber. (USDA, 2000, p. 496)

Despite the fact that existing uses of treated lumber may be “grandfathered in,” if the certifying agents observe a situation in which treated lumber in an existing facility presents a significant contamination hazard, the certifying agents may require the producer to take some action before they grant certification. For this reason, it is important to communicate with the certifying agents and determine how they view your current situation. It is also wise to clearly state your intention to use only certifier-approved materials for replacement and new construction when you submit your Organic System Plan to your certifying organization.

OPTIONS FOR TREATED LUMBER, PLYWOOD, WOOD PRESERVATIVES, AND FENCE POSTS

Considering the many situations in organic operations where wood is in contact with soil, seed, feed, or livestock, organic producers and handlers will need acceptable materials. A number of alternatives are available, such as untreated wood, alternatively treated wood, stone, brick, steel, materials made from recycled plastics, cement board panels, concrete blocks, and concrete.

Plastic Structures for Livestock Production

A few companies are manufacturing plastic products for use in commercial livestock production. Examples include EZHutch’s plastic Calf Hutch, A-frame hog hutch, and Mini Barn; NRP Plastic, Inc.’s plastic feed bunk; and JSI™ Innovations’ patented Plasta Post System (made of solid recycled plastic, these posts are placed in the ground and untreated 2" x 6" lumber is bolted on top to form a pole or column). Contact information for these companies is provided under **Further Resources**.

Before selecting which alternative products to use, the producer needs to evaluate each situation for:

- Effectiveness of the product for the task and conditions
- Durability of the product and the life expectancy required for the task
- Availability of the product
- Ease of installation
- Cost effectiveness of the product and any maintenance needed
- Safety

The problem with untreated lumber is decay or rot, especially when the wood is placed in contact with the soil. Redwood, Eastern red cedar (juniper), Western red cedar, black locust, and bald cypress are domestic wood species that are naturally more decay-resistant than others. However, not only can durability vary among different wood species, it can even vary between trees of the same species or within one tree itself; this can cause a wide range of life expectancy for even highly durable wood (Hoffman et al., 1995). One anecdotal source suggests that black locusts grown on

poor soil are much more rot-resistant than those grown faster—in plantations—on good soil. Approved alternative wood preservatives can help extend the life expectancy for most wood (See *Alternative Wood Treatments* below).

High demand for naturally decay-resistant wood has caused some species to be harvested at a pace much faster than the forest's replacement rate. Young or second-growth trees are often less decay-resistant than mature trees. In some applications it may be desirable to avoid the expense and environmental impact of a decay-resistant wood species, choose an abundant, inexpensive, locally produced wood, and simply anticipate that the wood will need replacement after a period of time.

The following sections cover alternative products and treatments for organic producers to evaluate with their certifying agents:

- Preservatives applied before purchase
- Recycled-plastic “lumber” and plastic/wood composite lumber
- Alternatives to treated plywood
- Preservatives applied after purchase
- Alternative fence posts

Other materials, such as stone, brick, steel, concrete, and concrete blocks are familiar and their usefulness and practicality are generally understood.

Preservatives Applied Before Purchase

A limited number of alternative lumber treatments are available. These alternatives to CCA-treated lumber are free of arsenic, chromium, and other EPA-classified hazardous preservatives. However, they may contain ingredients that are synthetic or that are not yet evaluated by the National Organic Standards Board (NOSB) or approved by the NOP. The use of any of these alternative lumber products needs to be discussed in your Organic System Plan and with your certifying agents before any application or use.

Borates

Borates (boric acids and borax) have long been used for alternative wood protection and can be used in all types of lumber, logs, and plywood. Boric acid is a synthetic substance allowed for use in organic crop production as a “structural pest control, [not in] direct contact with organic food or crops” as noted in the National List (NOP section 205.601(e)(2)). Borate-treated lumber and borate wood treatments are available commercially. The 1998 Bio-Integral Resource Center (BIRC) (See **Further Resources**) article “Borates for Wood Protection” and the 2002 article “Alternative to Arsenic-Treated Wood” provide a history of the use of borate, review borate protection against various pests and decay, and list sources of borate-treated wood, wood protection products, and applicators. The 1998 article's conclusion is:

Boric acid and borates do not cause cancer, have low acute toxicity, do not cause skin allergies by contact, and generally are quite safe if properly used. Workers applying sprays should have respiratory protection and children and pets should never be given a chance to ingest large amounts of borate powder. Borates are now the safest and most effective wood treatment available, especially when used as part of an ongoing IPM program. (Quarles, 1998)

Borate wood treatments will penetrate to the center of the wood when the wood is dipped, especially when the wood is freshly cut or when seasoned wood is rewetted. However, because borates are water soluble, they will leach from the wood when in contact with water in the soil, leaving the wood unprotected. This is the reason that borate-treated lumber should be used only in locations that are at least 6 inches above the ground and protected from excessive rain. Borate-treated wood is not considered suitable for unprotected outdoor use, such as for fence posts or poles, but is suitable for most building construction purposes. Additional information on borate products and sources is available at the Green Builder Program's *Sustainable Building Sourcebook* for "Wood Treatments" at <http://www.greenbuilder.com/sourcebook/WoodTreatment.html>.

Ammoniacal Copper Citrate (CC)

Ammoniacal Copper Citrate (CC) is a recently developed wood preservative that has 62.3% copper as copper oxide and 35.8% citric acid dissolved in a solution of ammonia in water (Ibach, 1999). The treated wood initially will have a slight ammonia odor, but the odor dissipates soon after treatment. The copper protects against decay and insects, and the citric acid helps distribute the copper inside the wood. Because copper citrate was developed very recently, CC-treated wood is not yet widely available (Lebow, 2000).

Thunderbolt, Inc. in Riverbank, California (see **Further Resources**) has CC pressure-treated wood available, and states that it is ideal for use as grape stakes and fence posts. Thunderbolt, Inc. explains that CC-treated wood products are safe for use around humans, animals, and plants. Remember that these products have not yet been evaluated by NOSB or approved by NOP, and their use needs to be discussed with your certifying agents and written into your Organic System Plan.

Copper Azole (CBA)

Copper azole (CBA) is a wood preservative with active ingredients of copper, boric acid, and tebuconazole (azole), a synthetic organic carbon product used in fungicides (Lebow and Tipple, 2001). Copper azole has 49% copper as CU, 49% boron as boric acid, and 2% azole as tebuconazole dissolved in a solution of ethanolamine in water (Ibach, 1999). Azole is not on the National List of Allowed and Prohibited Substances and would need to be petitioned and evaluated by the NOSB for inclusion on the National List (USDA, 2002). CBA lumber use must be discussed with your certifying agents before any application and use, and written into your Organic System Plan. EPA has not yet established use and handling precautions for wood treated with copper azole.

Copper azole is the formulation used in Wolman® E preservative for Natural Select™ wood. For information and a list of distributors visit Arch Wood Protection, Inc. (see **Further Resources**) at <http://www.naturalselect.com/buy.htm> or call toll-free (866) 789-4567.

Alkaline Copper Quaternary (ACQ)

Alkaline Copper Quaternary Ammonium (ACQ®) is a wood preservative—containing copper and quaternary ammonium compound (quat) as active ingredients—that protects against rot, decay, and termite attack. There are two kinds of ACQ: ACQ Type B (ACQ-B) and ACQ Type D (ACQ-D). ACQ-B is formulated using ammoniacal copper and ACQ-D is formulated using amine copper. The compositions of both kinds of ACQ by weight are copper oxide 66.7% and quat 33.3% (Ibach, 1999). These products do not contain arsenic, chromium, or other EPA-classified hazardous preservatives, but they do contain copper and quat (Chemical Specialties Inc., 2001). Quat is a product commonly used in commercial disinfectants and cleaners. It acts as a co-biocide. It is a

synthetic material that is not on the National List of Allowed Substances. In order to be added, it would need to be petitioned and evaluated by the NOSB for inclusion on the National List (USDA, 2002). Some copper does leach from ACQ-treated lumber, making it unsafe for garden use. And because copper is highly toxic to marine life, ACQ is not recommended for aquatic environments (Rodale, Inc., 2000).

Preserve® and Preserve® Plus wood products are treated with Alkaline Copper Quaternary Ammonium (ACQ®). For additional information on these wood treatments and for an on-line searchable Distributors Locator, visit Chemical Specialties, Inc. (See **Further Resources**) at <<http://www.treatedwood.com>>. Northern Crossarm Co., Inc. at <<http://crossarm.com>> and Sunbelt Forest Products Corp. at <<http://sunbeltfp.com>> are two of the seventeen current producers of Preserve-treated wood in the U.S. (Chemical Specialties, Inc. 2002). Remember that these products have not yet been evaluated by the NOSB or approved by NOP, and their use needs to be discussed with your certifying agents and written into your Organic System Plan.

Recycled Plastic Lumber and Plastic/Wood Composite Lumber

“Lumber” made of recycled plastic or plastic/wood composite can provide durable, weather-resistant alternatives to wood for some applications. Formed plastic is approved only for use in non-structural applications, since it doesn’t have strength comparable to wood. However, plastic lumber can easily substitute for treated wood in non-structural applications, such as fences, sill plates, and raised beds. The plastics are rot- and corrosion-proof, and don’t crack, splinter, or chip. Even in exposed and sub-grade conditions, plastic lumber has a long life expectancy. It will not leach chemicals into ground or surface water or soil, as treated wood can. A challenging aspect of working with plastic lumber is its high expansion coefficient (varies for each product and manufacturer), which has to be considered when installing.

The number of plastic lumber manufacturers and their variety of products have notably increased recently. Some companies use only High Density Polyethylene (HDPE) plastic, while others use commingled plastic wastes. A few manufacturers even mix plastic with recycled tire rubber. Some plastic lumber will contain wood fiber, which helps strengthen the plastic and reduces expansion.

Plastic lumber is available in many configurations and sizes, including solid- and hollow-core dimensional products, and tongue-and-groove designs. The quality and product performance will vary by manufacturer; many manufacturers have independent testing results available (NCAT Center for Resourceful Building Technology, 2002). The enclosed listing of recycled material suppliers, from King County, Washington, is an excellent source of contact information, available online at <<http://www.metrokc.gov/procure/green/vendors.htm>>

Alternatives to Treated Exterior Plywood

There are a limited number of alternatives to treated exterior plywood, such as plastic panels, cement-board panels, and fiber-cement panels. For information on alternative products available in your area or regionally, check your local lumberyards or building centers, or visit the websites listed under **Sources of Further Information** below.

Plastic Panels

One alternative plastic product is called Controlled Density™ Molding (CoDeMo®), made by Priema Plastics. It comes in 4' x 8' sheets and is designed to replace marine and treated plywood. The panel is molded plastic with a foam core to make it lighter; all materials are recycled plastics. For more

information on CoDeMo®, contact Priema Plastics, Inc. in Des Moines, Iowa at (800) 776-7628, (515) 270-8306, or visit <<http://www.hettingatechnology.com/priema/codemo.html>>.

Polyboard sheets come in 4' x 8' sheets of various thicknesses from ¼" to 1". They are manufactured by Renew Resources, Ltd. in Toronto, Ontario, and are widely available. Contact Renew Resources at (800) 439-5028 or (416) 335-4040 for the nearest distributor. Additional information on Polyboard is available at <<http://www.renewresources.com>>.

Another product is a recycled 4' x 8' sheet plastic made from 100% polyethylene plastic. It comes in a variety of sizes and thicknesses. For more information, contact Center Industries, Ltd. in Sioux Center, Iowa at (800) 281-4049 or at <<http://www.center-industries.com>>.

Cement-board Panels and Fiber-cement Panels

Two other options are cement-board panels and fiber-cement panels. Several types of these panels are commonly used in commercial construction. Cement-board panels are very durable, inert, and fireproof. They may contain fiber reinforcement, and are available in a variety of thicknesses up to and over 1". By contrast, the thinner fiber-cement panels are used mainly as residential siding. The wood-fiber in these products can be from small-diameter wood species or reclaimed wooden processing waste. However, many fiber-cement panels may be too brittle to withstand animal encounters or other stressful situations, so evaluate each product's specifications before use. Both of these panels will most likely need some protective treatment on their exterior surfaces to protect them from weathering.

Plycem® is a noncombustible, structural, fiber-reinforced cement board. For additional information and location of the nearest distributor of Plycem®, contact U.S. Architectural Products, Inc. in Lincoln, Rhode Island at (800) 243-6677, (401) 725-8550, or at <<http://www.architecturalproducts.com>>.

Fiber-cement panel manufacturing companies are: Eternit, MaxiTile Inc., James Hardie Building Products, Georgia-Pacific, GAF Materials Corporation, American Fiber Cement Corporation, and CertainTeed. Information on many of these companies and their fiber-cement panels is available from NCAT's Center for Resourceful Building Technology (CRBT) by searching the on-line *Guide to Resource Efficient Building Elements* under the heading of "Siding and Trim" at <<http://www.crbt.org>>.

Preservatives Applied After Purchase

Wood preservatives are treatments designed to sustain the structural and surface integrity of wood. They protect untreated exterior wood from rot, decay, and water damage. Alternative wood treatments can be applied on-site by brush, roller, dipping, or spraying. The following wood treatments are not on the National List of Allowed and Prohibited Substances and would need to be petitioned and evaluated by the NOSB for inclusion on the National List (USDA, 2002). The use of any of these products needs to be discussed with your certifying agents before any application or use, and written into your Organic System Plan.

One commercial exterior wood preservative is Wood Impregnation #99 manufactured by Bioshield Paint Company of Santa Fe, New Mexico. It can be used on garden fences, cold frames, and many other outdoor applications. Bioshield also manufactures paints, stains, thinners, and waxes that are made from such naturally-derived materials as citrus peel oils and solvents, essential oils, seed

oils, tree resins, inert mineral fillers, tree and bee waxes, lead-free dryers, and earth pigments. For additional information on these products (including lists of ingredients) and for ordering information, visit the Bioshield website <<http://www.bioshieldpaint.com>> or call (800) 621-2591 or (505) 438-3448.

Another commercial exterior wood preservative is AURO No. 121 Natural Resin Oil Primer distributed by Sinan Company of Davis, California. This product penetrates the wood deeply to protect from within, and allows moisture exchange. Sinan recommends that it be applied in one thin coat and followed up in most cases with a glaze, stain, wax, or varnish. Sinan distributes other AURO Natural Paint products that are also manufactured from natural raw materials, including a linseed oil that is organically grown and not diluted with any kind of petroleum solvents. For additional information on these products and for ordering information, contact Sinan at <<http://www.dcn.davis.ca.us/go/sinan>> or call (530) 753-3104.

Lifetime Wood Treatment is a wood preservative manufactured by Valhalla Wood Preservatives, Ltd. in Calgary, Alberta, Canada. During our phone conversation, the Lifetime representative stated that the product contains no toxic ingredients or poisons and is made up of naturally occurring plant and mineral substances, combined in a special wood-treatment recipe that has been handed down through generations of a family of wood craftsmen. Valhalla states that its product can be used in direct contact with garden soil without any toxic effect. It is a one-time application that is not supposed to wear off. Wood used in direct contact with the soil, such as posts or stakes, should be soaked in it for at least two days before setting in the soil. For additional information or ordering, call (403) 228-5193 or visit <<http://www.valhalco.com>>. Lifetime Wood Treatment is not on the National List of Allowed Substances and would need to be petitioned and evaluated by the NOSB and approved by the NOP for inclusion on the National List (USDA, 2002). Lifetime Wood Treatment use would need to be discussed with your certifying agents before any application and use, and written into your Organic System Plan.

USDA-developed Wood Preservative

The following wood-preservative recipe was developed by the USDA's Forest Products Laboratory (FPL) to protect wood used above ground for up to 20 years (Moore, 1993). The preservative was not tested for in-ground use (MacMillen, 1995), but is "safe for wood used in the ground—that is, it won't leach toxic chemicals into your garden soil—and the wood will last longer than if left untreated" (Rodale, Inc., 2001). In the 2002 BIRC article "Moisture Management to Prevent Wood Decay," the authors state:

Unfortunately, the FPL's water repellent is not satisfactory for the Pacific Northwest or the southeastern areas of the U.S where warm temperatures and high humidity create optimal conditions for fungi. In these climates, or where wood is in contact with moist soil, addition of a copper-based chemical such as copper-8-quinolinolate [See *Note, next page] to the FPL's water repellent can be tried. (Daar and Olkowski, 2002)

The original recipe calls for using paraffin wax, a petroleum derivative that is prohibited under the NOP section 205.105 (c), but a substitute like carnauba or wood rosin wax may work as well. Remember that before using this or any recipe, it is necessary to make sure that all the ingredients are listed on the National List of Allowed and Prohibited Substances as NOSB approved, or are approved by your organic certifiers.

Ingredients:

1½ cups boiled linseed oil
1 ounce of paraffin (substitute carnauba or wood rosin wax, provided they contain no prohibited substances)
Enough solvent (distilled pine tar, mineral spirits, paint thinner, turpentine, citrus thinner, or whatever is approved) at room temperature to make the total volume of the mix one full gallon.

Directions:

Melt the paraffin over water in a double boiler. Do not heat over a direct flame. Away from the heat source, stir the solvent vigorously, and then slowly stir in the melted paraffin. Add the linseed oil and continue to stir thoroughly. Apply by dipping the untreated lumber in the mixture for three minutes or by brushing a heavy application across the wood's grain and on the cut ends of the lumber. The wood can be painted when it's thoroughly dry.

Cautions and suggestions:

This solution is flammable, so all mixing should be done outdoors. Wear gloves, avoid breathing the vapors, and avoid contact with face and eyes. The mixture may separate when cool; if so, just warm it to room temperature and stir. Like many other finishes, it may need to be reapplied every few years. The wood can be painted when the finish is thoroughly dry.

*Note: Copper-8-quinolinolate (oxine copper) is an organometallic compound and the formulation consists of at least 10% copper-8-quinolinolate, 10% nickel-2-ethylhexanoate, and 80% inert ingredients. Copper-8-quinolinolate is the only EPA-registered wood preservative permitted by the U.S. Food and Drug Administration for treatment of wood used in direct contact with food. It has a low toxicity to humans and animals, but is toxic to both wood decay fungi and insects (Ibach, 1999).

Alternative Fence Posts

The kinds of permanent or movable fences commonly used on farms include wood plank or rail, welded wire panel, barbed wire, woven wire, cable, plastic net, high-tensile, electric, or a combination of any of these. The various fencing materials and styles can all be used with alternative fence posts. The type of fence to use depends on the size and number of livestock, the purpose of the fence and the durability required, the soil type and terrain, and the types of crops and other vegetation that border the fence. Livestock will strongly test any fence when there is a lush green crop on the other side of it. Fences for handling facilities and confinement situations need to be stronger and taller than pasture, boundary, or temporary fences.

An excellent on-line source of general fencing information is the Maryland Small Ruminant Page. It has links to many publications on different types of fencing materials and construction techniques, as well as a list of many of the fencing vendors and manufacturers, at <http://www.sheepandgoat.com/fencing.html>. Another excellent source of information on fencing and grazing is the ATTRA publication [Introduction to Paddock Design and Fencing-Water Systems for Controlled Grazing](#).

One alternative to treated fence posts is untreated wood posts, but many species of wood used in fence posts rot rapidly when in contact with the ground. The enclosed publication from Coopera-

tive Extension of the University of Nebraska-Lincoln, *Native Wood Fence Posts* (Schmidt and Kuhns, 1990), lists the expected lifespan of many untreated wood species used for fence posts, along with information on some of the advantages of seasoning posts before use.

Three wood species are rated as having an expected lifespan of more than 20 years, even untreated. They are hedge (Osage orange), black locust, and Eastern red cedar (juniper). Depending on your location, these species may be available locally at sawmills or at lumberyards. Hedge posts and poles are available from Smith Postyard (see **Further Resources**).

According to *Native Wood Fence Posts*, most of the other wood species have shorter expected lifespans and require some method of protection from moisture. One method of protecting untreated fence posts is to wrap the part in the ground with plastic (Quarles, 2002). Another method of protection is to use an alternative exterior wood treatment to improve the post's life span (See *Preservatives Applied After Purchase* section). However, these alternative treatments are not yet evaluated or approved by the NOSB, and their use needs to be documented in your Organic Farm Plan and discussed with your certifying inspection agents before any application or use.

Besides untreated or alternatively treated wood fence posts, other options include plastic, steel T-posts, steel pipe, concrete, fiberglass, or even concrete-filled PVC pipe. These fence posts will vary in cost, availability, and practicality for each specific fencing need.

Many of the plastic fence posts are made from recycled plastic containers. They come in various lengths, dimensions, and colors; can be stapled, drilled, or cut like wood; and are self-insulating for electric fencing. Different fencing companies have various types of plastic posts available. Many of these companies can be located at the Maryland Small Ruminant Page <<http://www.sheepandgoat.com/fencing.html>>.

SOURCES OF FURTHER INFORMATION

General information on environmentally responsible building materials and practices in construction is available from NCAT's Center for Resourceful Building Technology (CRBT) (see **Further Resources**). CRBT identifies and promotes building products and methods that reuse salvaged, currently underutilized, or waste materials, and produce less pollution and waste than conventional materials and technologies. The CRBT also provides an excellent, searchable *Guide to Resource Efficient Building Elements*.

The Green Building Program's *Sustainable Building Sourcebook* also provides excellent information and sources of environmentally responsible building materials, such as wood treatments, dimensional lumber, engineered sheet materials, and others. The *Sourcebook* provides web access to detailed guidelines and resources on many different environmentally friendly building materials that would otherwise be difficult to find. The *Sourcebook* is available at <<http://greenbuilders.com/sourcsourcebook>>.

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FURTHER RESOURCES

Bio-Integral Resource Center (BIRC)
PO Box 7414
Berkeley, CA 94707
(510) 524-2567, Fax: (510) 524-1758
e-mail: <birc@igc.org>
<<http://www.birc.org>>

The non-profit BIRC was formed in 1979 to provide practical information on least-toxic, sustainable, and environmentally sound Integrated Pest Management (IPM) methods. Reprints of articles are available for \$6 each, plus \$1.50 postage. The journals IPM Practitioner and Common Sense Pest Control are published quarterly by BIRC. BIRC members receive one or both of these journals. Contact BIRC for membership costs.

NCAT Center for Resourceful Building Technology (CRBT)
PO Box 100
Missoula, MT 59806
(406) 549-7678, Fax: (406) 549-4100
e-mail: <crbt@ncat.org>
<<http://www.crbt.org>>

CRBT is dedicated to promoting environmentally responsible practices in construction by encouraging building technologies that realize a sustainable and efficient use of resources. CRBT produces the Guide to Resource Efficient Building Elements, which provides information on obtaining and building with recycled and other resource-efficient materials. The updated yearly guide contains information on more than four hundred building-materials manufacturers producing everything from foundations to roofing. The listing includes engineered wood, recycled plastic, rubber and cellulose fiber, and panel systems. The 118-page guide can be ordered from CRBT for \$28 or it can be viewed at <<http://www.crbt.org>>.

USDA Forest Service
Forest Products Laboratory
One Gifford Pinchot Drive
Madison, WI 53705-2398
(608) 231-9411
<<http://www.fpl.fs.fed.us>>

Conducts research on diverse aspects of wood use, including wood preservation, wood and fungi identification, and finishing and restoration of wood products. They have an excellent web search for the many publications and Techlines on various wood preservatives and treatments.

Smith Postyard
Jeff and Marla Smith
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(620) 625-3439
<<http://www.smithpostyard.com/fenmat.htm>>

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<<http://www.treatedwood.com>>

The manufacturer of the Alkaline Copper Quaternary (ACQ) wood preservative Preserve® and Preserve® Plus wood products.

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Smyrna, GA 30080
(770) 801-6600, (866) 789-4567
e-mail: <info@naturalselect.com>
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The manufacturer of the Copper Azole (CBA) preservative Natural Select™ Wood products.

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ACKNOWLEDGEMENTS

Special thanks for assistance with this document go to George Kuepper, NCAT Agriculture Specialist, and Tracy Mumma, NCAT Center for Resourceful Building Technology Specialist. Ann Baier, NCAT Agriculture Specialist, Jim Pierce at Organic Valley CROPP Cooperative in LaFarge, Wisconsin, and Ann Wells, NCAT Technical Manager, provided reviews and suggestions.

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Edited by Richard Earles and Paul Williams
Formatted by Cynthia Arnold

July 2002

The electronic version of **Organic Alternatives to Treated Lumber** is located at:
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