

finish line

Indigo on wood

TRADITIONAL VAT-DYEING
YIELDS RICH AND
UNEXPECTED COLOR

BY HEIDE MARTIN

When I decided that I wanted to achieve a true indigo color for a table I was making (pp. 56–65), I quickly realized that aniline dyes would not give me the richness and tonal variety I was looking for. I decided to explore traditional indigo vat dyeing techniques, long used to give brilliant color to wool, silk, and linen. But I found precious little information on how to transfer these processes to wood.

Through trial and error, help from *The Modern Natural Dyer* by Kristine Vejar (Harry N. Abrams, 2015), emails with woodworkers who have tried similar experiments, and a lot of Internet research, I achieved a vat-dyed color with all the depth, vibrancy, and variety I had hoped for, all for around \$100 in supplies.



What you need to get started

MATERIALS

NATURAL INDIGO EXTRACT

botanicalcolors.com

SODIUM HYDROXIDE (LYE)

Amazon.com or local hardware store (common lye drain cleaner)

SODIUM HYDROSULFITE & SODA ASH

dharmaTrading.com



TOOLS

5-GAL. BUCKET

WIDE MOUTH QUART-SIZE JAR (for the mother)

SIPHON GUN

PLASTIC SPOON

GLASS OR PLASTIC MEASURING SPOONS AND CUPS

*These kitchen-type items should only be used for dying afterward.

WOODEN OR PLASTIC STIRRER (such as a dowel or long spoon)



Select and prep the wood

Vat dyeing wood can be risky. It will raise the grain, may cause warping on thin pieces, and requires a vat large enough for immersion (in my case a 5-gal. bucket).

The pigment does not penetrate very deeply, so machining and sanding after dying can be difficult or off limits. Soft hardwoods, such as poplar and English sycamore, work best. Denser hardwoods, such as ash and maple, do not absorb the dye as readily.

Prepare your materials by sanding up to 220 grit. Then wet them to raise the grain and sand again with 220. Do this at least twice, removing the dust with a dry rag or compressed air.

Prepare the dye in two steps

To start an indigo vat, you first must create a highly concentrated indigo



Create the mother

To start the dye process, mix the highly concentrated stock solution, called the mother, that you'll use to make the dye. Wear protective eyewear and clothing.



Indigo meets water. Start with $\frac{1}{4}$ cup of hot water in a mason jar and gently stir in 3 tablespoons of indigo extract.



Introduce lye to the indigo. Fill the mason jar with cool water, and then add 1 tablespoon of lye. Carefully stir until the lye is dissolved. Lye is used to raise the pH.



Sodium hydrosulfite joins the party. Add 1 tablespoon of sodium hydrosulfite and stir again until it's dissolved. Sodium hydrosulfite removes excess oxygen from the mixture by releasing hydrogen.



solution, known as the mother. Indigo is sensitive to oxygen and temperature, so avoid adding air to the mixture, and work in an environment that is around 65° to 75°F.

I'll give directions for a 5-gal. dye vat, the largest I've made. To make the concentrated solution, add $\frac{1}{4}$ cup of hot water to a quart-size, wide-mouth Mason jar. Add 3 tablespoons of natural indigo extract. Fill the jar with room-temperature water, stir, and then add 1 tablespoon of lye and stir again.

While you can pick up lye at any hardware store, be careful with it. Wear gloves and protective eyewear. Mixing lye and water together causes an exothermic reaction, where heat is given off. So always pour the lye into the water, and do it slowly. If you don't, you can create a volcano effect, in which

Online Extra

To watch a video about other natural finishes, go to FineWoodworking.com/276.



Warm it and wait. Place a lid on the jar and leave it in a warm room or in a pan of warm water for about 20 minutes. The liquid should be ready when it turns from deep blue to greenish. When dripped on white paper, it will turn from green to blue as it oxidizes.

Make a vat

With the mother mixed, it's time to fill a bucket and add some of the stock solution. While working with soda ash, protect yourself with goggles, a respiratory mask, a long-sleeved shirt, pants, and gloves.



Fill the vat and increase the pH. Use hot tap water, at 100°F, to fill the container you're using for the vat. Add 8½ teaspoons of soda ash (top)—wear protective eyewear and clothing. Stir the mix, and then test the pH (above). It should be just under 11.

a crust is formed over the solution, heat and pressure build up, and it erupts. Don't let this scare you; people all over the world use lye to make soap. Just take the proper precautions.

Now add 1 tablespoon of sodium hydrosulfite to remove excess oxygen. Stir again, then place a lid on the jar and set it aside in a warm room (or place it in a pan of warm water) for about 20 minutes. After it sits, it should turn from deep blue to clear greenish yellow.

To prepare the vat, fill a 5-gal. bucket with hot tap water (100°F). Add 8½ teaspoons of soda ash and stir with a

wooden or plastic implement until it dissolves. Test the pH. It should be just under 11. If it is lower, add more soda ash. Carefully add 7/8 cup of the mother solution to the vat. Add a scant ¼ teaspoon sodium hydrosulfite. Stir gently, then cover and let it rest for at least 15 minutes. The vat is ready when it is greenish-yellow with a coppery sheen on the surface.

Dyeing and drying

Carefully lower your workpieces into the vat. Try to avoid splashing, as this will add oxygen to the mixture. Leave the materials immersed for anywhere from one minute to 30 minutes. Deeper colors are achieved through multiple, shorter



Float the mother mixture into the vat. Rather than pour it in, introducing excess oxygen, float 7/8 cup of the concentrated solution into the vat water (above). Gently stir. Add ¼ teaspoon of sodium hydrosulfite (below) to get rid of any oxygen you may have introduced, and let the vat rest for 15 minutes. When it turns greenish-yellow with a coppery sheen on the surface, it's ready.



Let the dyeing begin

Prepare your workpieces by raising the grain, and then you can start the fun of dyeing them.



Raise the grain. Immerse the workpieces in warm water, let them dry, sand them back with 220-grit paper, wipe away the dust, and repeat.



dips, rather than fewer, longer ones. You may need to hold the materials beneath the surface to ensure an even dye. Carefully remove your materials from the vat and hang them up.

This moment is fascinating: The wood will change from a greenish color to indigo before your eyes. After the green color has fully disappeared (this can take up to 30 minutes), the wood can be redipped repeatedly to achieve a darker shade. After your final dip and oxidation, rinse any dye residue off with water and allow the pieces to dry for at least 24 hours.

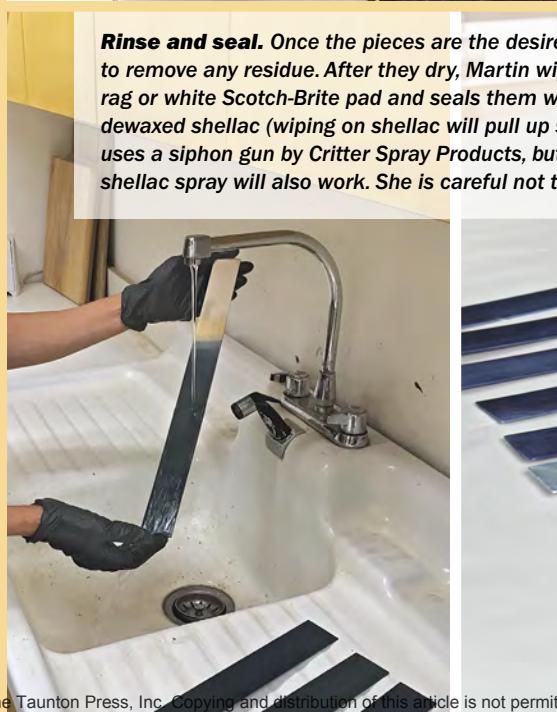
Coat the dyed surfaces

Once the wood is dry, I spray the dyed surfaces with a couple of coats of shellac before I start working with them. When the piece is complete, I apply a spray finish. I have had success with both Super Kemvar-M and Minwax Polyurethane. □

Heide Martin designs and builds home furnishings in Midcoast Maine.



Dunk and dry. Clamping the strips between pieces of plywood, Martin slowly dips them into the vat (left). Resting the shopmade armatures across the top of the vat allows her to dye more than one set of strips at a time. These holders do double duty as racks while the pieces oxidize and dry (right).



Rinse and seal. Once the pieces are the desired shade, rinse them to remove any residue. After they dry, Martin wipes them with a clean rag or white Scotch-Brite pad and seals them with a spray coat of dewaxed shellac (wiping on shellac will pull up some dye). Martin uses a siphon gun by Critter Spray Products, but a can of dewaxed shellac spray will also work. She is careful not to spray glue surfaces.

