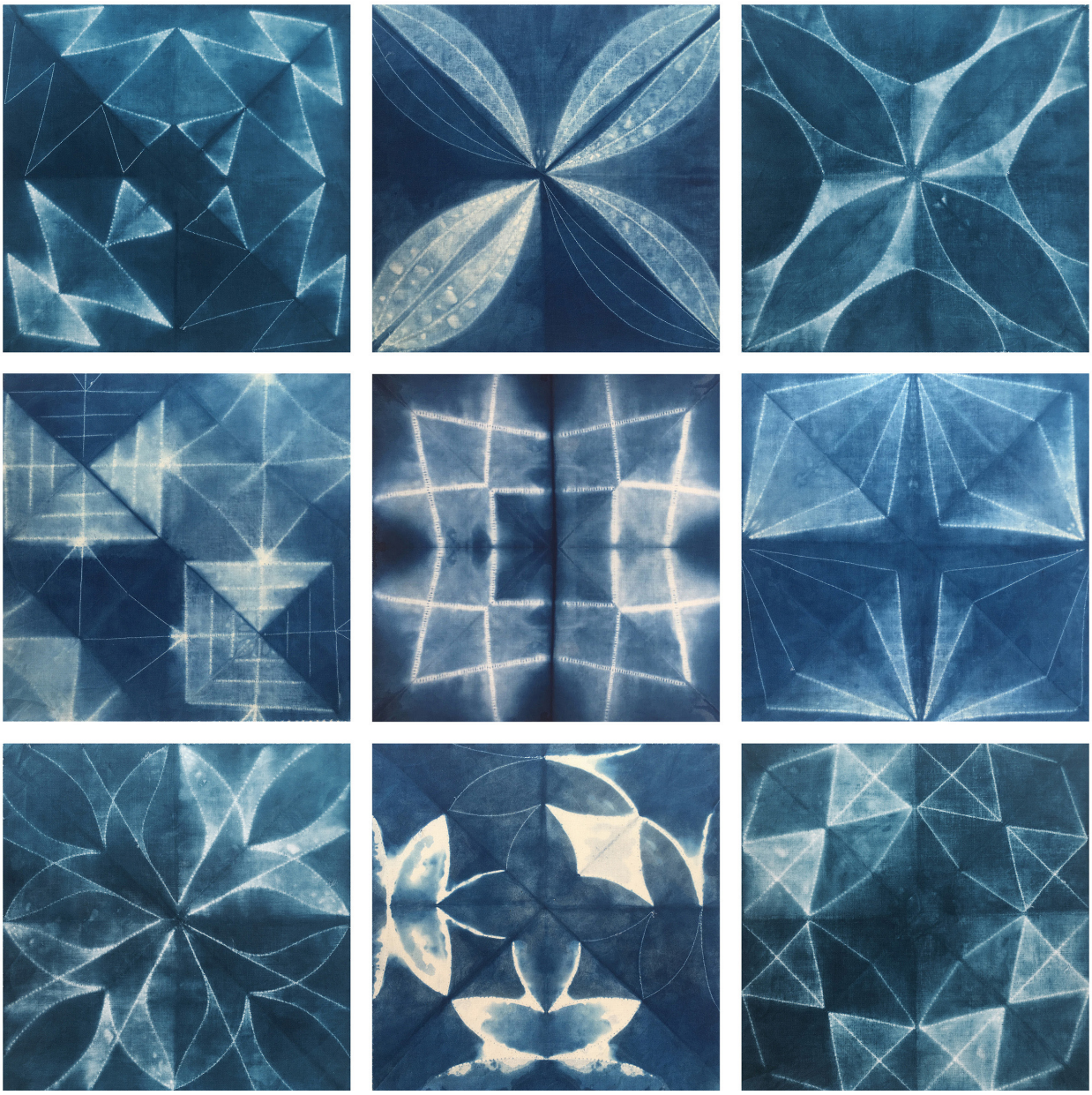
INDIGO

HOW TO MAKE, USE, AND TEND A NATURAL VAT



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History

Indigo cultivation is thought to have existed in the Indus Valley (present-day Pakistan and Northwest India) more than 5,000 years ago and there have been recent discoveries in Peru that date Indigo cultivation and use to 6,000 years ago.

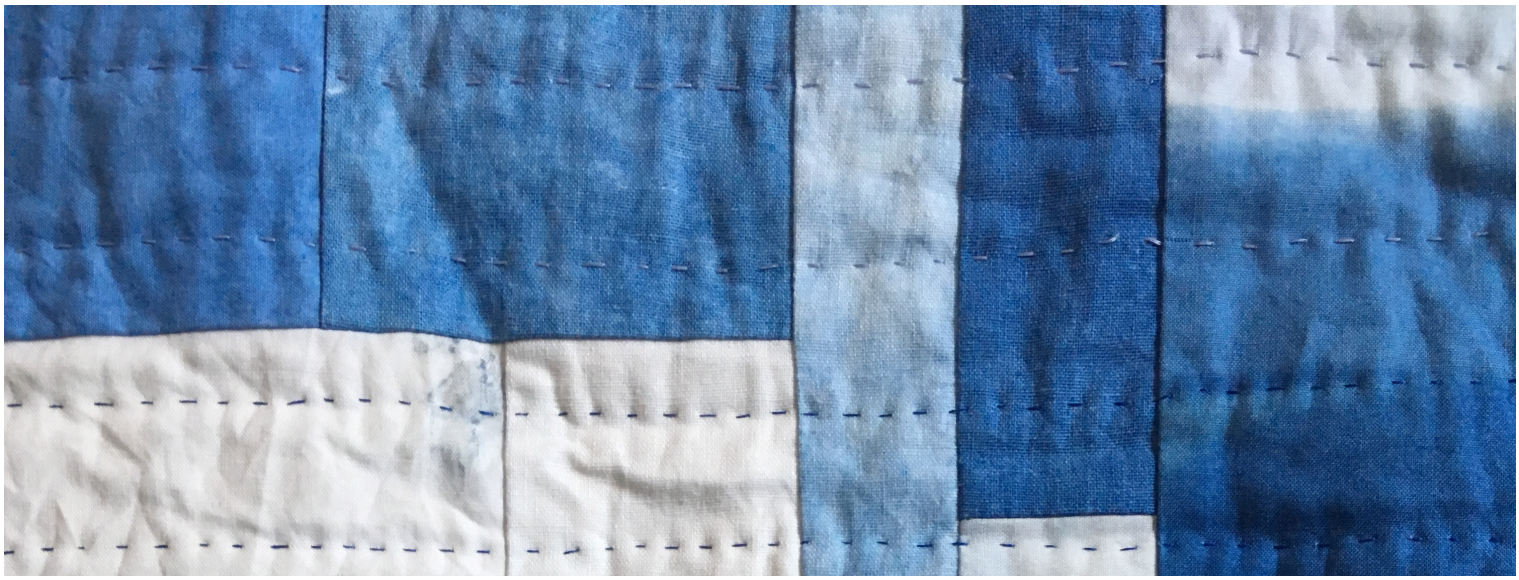
It is the only plant pigment that creates a permanent blue dye, and varieties of the palnt were disovered and used as dye in many different parts of the world including Africa, Asia, South and Central America, and Europe. The word "indigo" is now used to describe the dyestuff, the plant, and the color.

"Indigo" as a pigment molecule exists in both indigo plants, indigofera, and woad plants, satis tinctoria. Indigoera is a large enus of over 750 speices. Several species in the family, including Indigofera tinctoria, persicaria tinctorum, and indigoera suffruticosa, are used for indigo dye. Organic indigo comes from the leaves of the indigo plant.

You will most likely find it in a finely powdered form, but it is also sometimes sold as cakes.

The natural indigo vat recipe included is my favorite way to make an indigo vat because it is all natural and uses safe ingredients, it smells good, it makes a beautiful color, and it's relatively easy to keep alive. I have had indigo vats that lived up to a year! You have to do a little more work to find the ingredients and keeping a vat alive takes some time and attention, but I think it's worth it.

Indigo is an interesting class of dye called a vat dye. It is not water-soluble, meaning if you add indigo powder to water and shake it up, the indigo will not dissolve. It will float around, suspended in the water. comparison is to think of the difference between adding sand to water vs. adding salt to water. In order for indigo to become soluble and turn into a dye, it has to go through a process called reduction. In the following recipe, we will use fermentation to achieve reduction.



Making the Vat

Ingredients

100g	Natural Indigo powder
200g	Pickling Lime (calcium hydroxide)
300g	Henna powder
1lb	Fructose

Supplies

- Gram scale
- Plastic bowl
- 5 gallon plastic bucket with lid
- A thick wooden dowel that will reach the bottom of the bucket
- White plastic spoon
- Rubber gloves
- Dust mask
- Whisk
- Plastic container with a tight fitting lid
- A handful of pebbles or marbles

Wear a dust mask when working with the indigo powder and the pickling lime. Neither will hurt you, but they are both finely powdered and can cause a bit of irritation (and blue sneezes) if you breathe in too much of the dust.

1. Add 4 gallons of hot water to your 5-gallon bucket. Use the hottest water you can get that you can still touch. If your tap doesn't get very hot, you can use a tea-kettle to boil some of the water.

2. Weigh the henna and then whisk it into the hot water, adding a small amount at a time until all of it is added and there are no lumps.

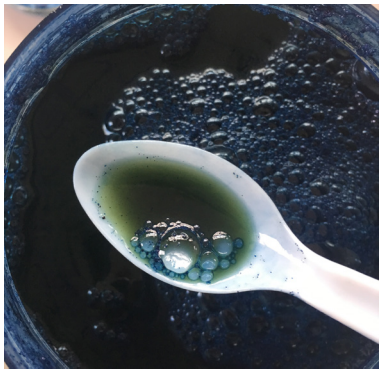
3. Crush the indigo to hydrate it. This will allow the indigo to reduce more quickly in the vat. To do this, put the glass marbles or pebbles into the small plastic container with a lid. Weigh the indigo powder into a plastic bowl and then add it to the marble container. Pour in about a cup of hot water. Put the lid on and shake vigorously for a minute or two.

4. Add the crushed indigo to the bucket. Rinse the marbles and plastic container with some more hot water and add this to the bucket as well. Don't waste any precious indigo. Stir the vat gently.

5. Weigh the pickling lime and stir it into some hot water. Add the pickling lime liquid to the vat. Stir gently in a smooth, circular motion in the center of the vat.

6. Wait at least an hour for the indigo to reduce. Waiting longer is ideal and overnight is best.

7. Observe the vat. When it is ready, the surface of the vat will be shiny with a metallic looking coating. It will have dark bubbles on the surface. A spoon dipped below the surface will show greenish yellow or amber liquid.



Dye Process

It's a good idea to do a test dip on a small piece of fabric at the beginning of every dye session to make sure your vat is happy and healthy. A small strip of cotton labeled with the date serves this purpose well. Dip it into the vat for a minute or so, rinse the strip, let it oxidize, and observe the color.

Always move slowly and deliberately when using a vat. Any extra oxygen that is added to the vat through splashing,
aggressive stirring, or dripping can exhaust the vat. Wet fabric will introduce less oxygen to the vat than dry fabric and will absorb dye more evenly.

Wet the fabric first and dip slowly and gently into the vat. Allow the fabric to be submerged in the vat for 5 - 10 minutes. Remove the fabric carefully from the vat, being careful not to drip into the vat. The fabric should be yellowish green and will gradually change to blue in the air. Placing the fabric in a container of cool, clean water can speed up the process.

Once the fabric is fully oxidized it will look completely blue and it is ready to be dipped again. Your fabric will get darker with each dip in the vat. If you are looking for a range of values, the natural vat is a great choice. Between each dip rinse the fabric gently with cool water and allow it to oxidize fully before dipping again.

When you have reached the desired shade of blue, finish the fabric as described on the next page.

Tending a Natural Vat

After every dyeing session add 1 - 2 Tbsp. of fructose, stir the vat gently and thoroughly, cover, and let rest over night. It should be ready for use again the next day.

If the vat is not responding to the addition of fructose, it may need more pickling lime. An easy test is to sprinkle a bit of pickling lime into the vat. If it floats on top, the alkalinity of the vat is fine. If the pickling lime is sucked down into the vat quickly, the vat has become to acidic. Add a few tablespoons of pickling lime and stir gently. Let the vat rest before testing it again.

With prolonged and extensive use, a vat may occasionally need more indigo. If the vat looks healthy (yellow green or amber colored liquid, a flower on top, no floating blue particles) but isn't providing good color, then it is time to add indigo. Crush 1 – 2 grams of indigo per liter of liquid in the vat (16 - 32 grams for a 5 gallon vat) with some hot water following the directions on page 3. Then add all of the liquid to the vat, stir gently and allow to reduce before testing the vat again.

Natural vats don't tolerate cold temperatures too well. If possible, keep indoors in a temperature controlled environment. If this is not possible, an aquarium heater in the vat or a heating pad wrapped around the vat will keep it warm.

A natural vat, when no longer wanted, can be poured out into your garden. Plants that like alkaline soil will be especially happy to receive it.

Washing or "Finishing"

It is important to "finish" indigo dyed cloth so that it doesn't crock, or rub off, on other fabrics, furniture, walls, or you.

1. Rinse your fabric well in cold water.
2. Wash by hand in a bucket of hot, soapy water. Blue dawn or synthrapol are good detergents to use when washing dye out of fabric.
3. Add about 1/4 cup of distilled white vinegar to a gallon of cold water. This will be enough for small samples. If you have larger pieces of cloth, scale up the amounts of vinegar and water. Submerge your indigo dyed cloth in the vinegar water for about 20 minutes. The weak acid of the vinegar helps neutralize the alkalinity of the indigo vat.
4. Boil gently for 20 minutes in a pot that isn't used for food with a small amount of pH neutral detergent like synthrapol, orvus paste, or blue dawn. The finishing and boiling step can happen right away, or you can wait until you have several pieces ready to finish. But make sure you do this before using your fabric in a project!

Resources

Supplies

Maiwa (Canada)
Indigo + auxilliary chemicals
http://www.maiwa.com/home/supply/index.html

Star West Botanicals
Henna, clay resist supplies
https://www.starwest-botanicals.com/

Botanical Colors
Indigo + auxilliary chemicals
http://botanicalcolors.com/

Information

Michel Garcia
French, botanist and chemist
https://naturaldyeworkshop.com/

Catharine Ellis
Very informative blog, a natural dye book on the way
http://blog.ellistextiles.com/

Rowland Ricketts
Indigo inspiration and seeds
http://www.rickettsindigo.com/

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email: kim@kimemquilts.com
instagram: @kimemquilts
Please tag me if you post your indigo adventures on instagram. I would love to see what you make!