Earthly Colors

A Natural Dye Journal

Kate Jaffe and Kris Nardello

Presented by the

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What Are Natural Dyes?

Natural dyes are dyes or colorants derived from plants, invertebrates, or minerals. The majority of natural dyes are vegetable dyes from plant sources—roots, berries, bark, leaves, and wood—and other biological sources such as fungi and lichens.

Archaeologists have found evidence of textile dyeing dating back to the Neolithic period. In China, dyeing with plants, barks and insects has been traced back more than 5,000 years. The essential process of dyeing has changed little over time.

The discovery of man-made **synthetic dyes** in the mid-19th century triggered a long decline in the large-scale market for natural dyes. Synthetic dyes, which could be produced in large quantities, quickly superseded natural dyes for the commercial textile production enabled by the industrial revolution, and unlike natural dyes, were suitable for the synthetic fibres that followed.

In the early 21st century, the market for natural dyes in the fashion industry is experiencing a resurgence. Western consumers have become more concerned about the health and environmental impact of synthetic dyes in manufacturing and there is a growing demand for products that use natural dyes. The European Union, for example, has encouraged Indonesian batik cloth producers to switch to natural dyes to improve their export market in Europe.

How Do I Source Materials For Natural Dyes?

Natural Dye materials are all around us! You can find great natural dyes anywhere from your kitchen to the weeds in the sidewalk. Here are just a few examples of the different sources:

Kitchen: onion skins, avocado pits, pomegranate, black tea, walnut hulls
Home Grown: indigo, marigold, mexican tarragon, dahlias, madder
Foraged: dyer's polypore fungus, dead man's foot fungus, eucalyptus, english ivy, fennel
Purchased: fermented indigo, cochineal, any from above.

When foraging your own materials, there are a couple of things to consider:

Ethical harvesting: Please take into consideration your specific plant along with its local ecology. For example, harvesting a rare plant, even if the individual is abundant is bad for the ecosystem. Harvesting too much off of an individual plant, even if the species is abundant is bad for that plant's health. In general, taking 1/10th or less of a common plant's biomass is a good place to start.

Laws and regulations around harvesting: There are many laws and regulations around harvesting especially if you are not on your own land. These vary place to place so be sure to look up what the regulations are in the area you are hoping to forage to avoid breaking the law and possibly being ticketed.

Knowing how much to get: Always refer to a recipe before harvesting so that you only harvest the amount you need for your project. It is a shame to harvest and not use something that the plant would have kept using!

Getting to know your place: Foraging is a great way to become acquainted with the area around you and its unique flora and fauna. The more you come to know your place the better forager you will become. Always be sure to look up the poisonous plants, snakes and spiders before entering an area. Awareness is key to safety and fun! Also, in becoming acquainted with the place and its species, you become more attuned to what the appropriate amount to harvest is - which makes you a better ecologist, citizen, and crafter.

Choosing Textiles

Fibers can be generally sorted into three categories: **Vegetable**, **Protein**, and **Synthetic**.

Vegetable or Cellulose Fibers: Fiber originating from plant materials. These include materials such as cotton, hemp, linen, bamboo, and more.

Protein Fibers: Fiber originating from animal sources. These include materials such as wool, angora, mohair, cashmere, silk, and more.

Synthetic Fibers: Fiber from human made sources. These materials such as nylon, polyester, and rayon.

When beginning a project, it is very important to consider which type of material you are hoping to dye, as each category reacts differently. For example, it is very difficult to use Natural Dyes to

color synthetic fibers, whereas protein fibers take Natural Dyes quite well. In your next project, be sure to research how your specific dye and the material you are hoping to color react to each other.

Stove Top Dyeing

These directions are for animal or protein fibers (wool, alpaca, yak, dog, musk ox, llama and silk).

Types of dyes can be generally sorted into three categories: **Adjective/Mordant**, **Substantive**, and **Vat** dyes.

Adjective or mordant dyes: For these dyes you need a mordant for colors to develop fully and become fixed permanently (see below). The majority of natural dyes fall into this group including garden flowers & plants from the roadside.

Substantive dyes: These dyes may be fixed within the fibers without the assistance of any other substances. Often rich in tannins like barks, leaves and fruits of trees such as eucalyptus, onion skins.

Vat dyes: These dyes do not bond chemically with fibers, but rather coat the outside of them. Methods for making and using these dyes are quite different from those of other natural dyes. Fermentation is one of the processes involved to make the coloring material water soluble. Examples of vat dyes are indigo, woad, and Tyrian purple.

Mordanting Procedure

Keep in mind that your dye job is only as good as your mordant job. It's the foundation!

1. Weigh fiber when dry. This weight is known as WOG or Weight of Goods and is essential to know in order to calculate the amount of mordant and dye stuff to use. If using commercially spun yarn, the weight is usually printed on the band around the skein when purchased.
2. If dyeing yarn, tie around the skein loosely in 3-4 different places to keep strands in order. A figure- 8 tie with uncolored cotton string is recommended.
3. Wash fiber in warm sudsy water with a good grease-cutting detergent like Dawn. Use a minimum of agitation and rinse 2-3 times in like temperature water. Let soak while you prepare the mordant.
4. Calculate the amount of alum mordant to use based on the weight of goods(WOG). We recommend using 15% plus 6% cream of tartar (CoT). Though optional, the cream of tartar makes for a more even color, keeps the fiber softer and allows drying for storage after mordanting. If you don't want to do a lot of mordanting, both alum and cream of tartar may be found in the baking section of your grocery store, however, this is much more expensive than buying alum and cream of tartar in larger quantities intended for dyeing and not human consumption.

   Example for one pound of fiber:
   16oz. (WOG) x 15% = 2.4oz alum (~4 tbsp + 1 tsp)
   16oz (WOG) x 6% = 1.1oz cream of tartar (~2 tbsp)
5. Dissolve the alum first in boiling water stirring until it is in solution, then add the cream of tartar and stir until dissolved.
6. Fill an aluminum, stainless steel or porcelain kettle with warm

water enough to cover your fibers/fabric. Add mordant and stir. Squeeze the water out of your fiber and enter it into pot. Cover pot. Over the course of 45 minutes, bring the temperature of the mordant/water solution up to 170-180 F. Monitor the temperature to keep it below boiling and hold at that level for 45 minutes. Turn off heat and allow fiber to cool off in mordant solution overnight.

7. Wearing rubber gloves, remove fibers and squeeze out liquid.
8. Rinse in like temperature water. At this time, you may proceed to dye or hang outside to dry and store until needed.

Making The Dye Pot

1. Gather dye material. You will usually need the same weight of dye stuff as WOG. This is not a precise measurement, so just know if you use more than a 1:1 proportion, you may get a more intense color with the reverse if you use not enough. You can always dye your fibers a second or third time if they are too light, of course adding more dye material each time, but you will never need to mordant a second time. (The only exception would be if you wanted to use a different mordant in addition to alum to get a different shade of color, like for example with iron.)
2. Cut branches into 3”-4” pieces. You may want to remove the stems from flowers. With leaves and woody plants, I usually pouring boiling water over them in a 5-gallon bucket and let them steep/soak overnight.
3. Place into non-reactive pot (stainless steel or porcelain), cover with water and bring up to simmer, about 170-180 F just like with the mordant solution. Hold at that temperature for about an hour. Let it cool off overnight. Strain out plant material with colander and compost. If the dye stuff has become gooey or contains small particles, line the colander with several layers of cheesecloth or other fabric so that you won’t get those little

bits in your yarn or making dark marks on your fabric. Your dye is ready.

4. Add fiber or fabric and bring it slowly up to 170-180F, hold for 45-60 minutes. Allow to cool off in pot overnight.
5. Wearing rubber gloves, remove fiber and let air dry without rinsing for at least one week. Many natural dyes seem to gain in light- and wash-fastness by allowing them to age for a while. Nothing bad will happen if you let them go longer without rinsing. After aging, soak/wash in warm water with a little shampoo or mild detergent, rinse 3 or more times. At this point, you may add a little hair conditioner to the final rinse. Squeeze out water, wrap in towel and stand on it to wick out water. Air dry in shade and enjoy your beautiful color!

Disposing Leftover Dye/Mordant

If you have correctly calculated the amounts of alum and cream of tartar, much of it will have been taken up by the fiber. Whatever is left can be poured on garden plants without a problem. Acid-loving landscape plants like rhododendrons and azaleas especially like being watered that way. Your natural dye bath can be used in a similar way or poured into your compost pile. (The exception is with black walnut dye. There are some plants that are extremely sensitive to the natural chemicals in this dye, so I would advise pouring it down the drain or dumping it onto a far corner of your yard away from rhododendrons and azaleas.)

Shibori Techniques

There are many different shibori techniques. Two types of this Japanese resist dyeing technique are given here.

Fold and clamp shibori or itajime is one type of resist dyeing where dye colors the cloth and is prevented from coloring other parts with two matching shapes clamped on either side of the folded silk. The areas that do not get dyed become a repeated pattern:

1. Fan fold your fabric. You can fold from one side and then the other. Crease the folds with your fingers or an iron as you fold and work to keep the edges aligned.
2. Use 2 wood or plastic pieces of the same shape, one for each side of the cloth bundle. Position them directly on top of each other and use C-clamps, electrical clamps or two or more sticks bound together to tightly block off sections of the fabric. Leave parts of the cloth exposed so there will be parts to take up the dye.
3. Soak in water for 30 minutes. Squeeze out as much water as possible and place in dye bath of your choice. Leave for at least 1 hour.
4. Remove from the dye, take off all resists. Put them in bucket to be washed, dried and reused. Rinse cloth and hang to dry.

Twist and bind shibori uses rubber bands and/or cotton string to resist the dye. The fabric may be twisted tightly, then folded and bound with rubber bands or string. All twisting and binding must be very tight to prevent dye from entering. Have a partner help if you need another set of hands while applying binding. It also helps to have an anchor while you're twisting. Some anchors are a clipboard, a C-clamp or other fixed point. Continue with #3 in directions above.

Recipes

Avocado, *Persea americana*

You don't have to go out foraging for every natural dye you make; some can be made from materials found in your kitchen! Avocado pits and skins can turn natural fibers a delicate pink or coral color. Adding ammonia helps to bring out the red from the pits and skins.

1. Gather avocado pits and/or skins
2. Wash off any remaining pulp from pit or skin and let dry for at least one day
3. Chop avocado pits into smaller pieces to allow more extraction
4. Add 1/2 cup ammonia to gallon jar
5. Add avocado pits to jar
6. Pour near boiling into jar over pits and ammonia until full
7. Cover and let sit in the sun
8. Every week pour back into pot and reheat to about 160 degrees F to stave off mold, which will alter your color, then pour back into jar.

Note: Do not boil your mixture as this will alter the color; however, it will not ruin the dye pot if you do accidently boil your mixture. Your color will be just slightly less coral. The longer you let your dye pot sit, the more rich the color will be. You could wait a week, you could wait a month, you could wait several months. Just be sure to warm your mixture up every 3-7 days to keep it from getting moldy.

9. When you are ready to dye, heat your dye in your designated dyeing pot to about 160 degrees F
10. Submerge your fabric (scoured, mordanted, and pre-moistened) into your pot for 45-60 minutes.
11. Remove and let air dry for a week or more before washing.

Dead Man's Foot, *Pisolithus tinctorius*
This common brown puffball found on exposed soil and roadsides makes an excellent dye when it is young and "juicy" before the spores mature into fine dust. Makes beautiful red-brown and gold dyes.

When collecting this fungus, wear gloves and try not to breathe in the spores. Place in a plastic bag and close it up to transport or store. The fine dark spores stain anything they touch! This dyestuff is difficult to dissolve in water, and a little Dawn detergent plus vigorous boiling may be necessary to make dye.

1. Fill dye pot half full of warm water so that your yarn or fabric will have room to move during dyeing. Working outdoors and wearing gloves, carefully dump the puffball and spores into the dye pot. Avoid breathing the spores. Stir, cover pot and put on heat to cook. You may need to repeatedly cook and cool, stirring occasionally until nothing is floating on the surface anymore. If there is a remaining lump of the puffball, you may scoop it out and cut it into chunks before returning everything to the pot. Additional cooking releases more dye from exposed surface areas.
2. Strain out all the bits and pieces of puffball using layers of cheesecloth in colander. Compost bits.
3. Enter yarn/fabric, bring slowly to simmer and hold at that temperature for 45-60 minutes. Remove and let air dry for a week or more before washing.

Silver Dollar Eucalyptus, *Eucalyptus cinerea*

Dyes from eucalyptus species require long processing to achieve their full color potential. The leaves from all species of this Australian native produce color from rust and brown to gold.

1. Chop up the leaves and cover with boiling water to soak overnight.
2. Simmer gently for at least an hour, cool overnight, and repeat several times.
3. Add fiber to be dyed and simmer gently for several hours. Cool in dyepot. Remove and air dry for at least a week before rinsing.

Note: Deeper colors will be possible if the leaves are left in the dye bath with the fibers.

My Dye Journal

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