NATURAL DYE SERIES

Easy Peasy Natural Dyeing

Photos by Matt Graves, Martha Owen, Joe Coca

Photo by Matt Graves

There are so many reasons that we might hesitate to plunge into natural dyeing. Sometimes we just don't have the resources—time, brain space, budget, or all three—to devote to a craft that can have a steep learning curve. Or perhaps you are worried about "ruining" good fiber and ending up with a pile of beige skeins.

These are all very real concerns, and we hope we can help smooth your path. These experienced natural dyers offer some easy ways to get started. Learn how to use common grocery items like onion skins, alum, and vinegar with Madeline Keller-King. Then Dagmar Klos encourages you to dip into your stash yarns to create a cohesive palette by overdyeing with tea, black walnuts, and marigolds. And, finally, Martha Owen shares her "magic pot" method of combining multiple dyestuffs for a fun, multicolor effect.

Jump on in, the dyebath's fine!

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Photos by Matt Graves

Onions, members of the lily family, yield glorious color.

An Ode to Onion Skins

Modifying a Humble Dyestuff

MADELINE KELLER-KING

O' humble little onion
Grown round beneath the ground,
Staple of our pantries
And of dishes the world 'round.

O' what cheerful surprise to see
Golden shades brought forth from naught,
As if the sun's own rays
Come into my little dyepot!

—Madeline

Most of us can recall our first project—that awkward scarf, a woven swatch, or the somehow over- and underspun skein of yarn. Natural dyeing is the same, and most dyers I know can tell you where their joyful journey began.

My moment of curiosity was sparked by a book I still hold dear. I had already begun shifting away from acrylic yarns toward natural fibers when I scored a copy of *The Natural Knitter* by Barbara Albright, on sale at a local used bookstore. My 20-year-old self was drawn in by the lovely patterns and information on different types of natural fibers. Then it happened. I noticed something toward the back of the book—just a small excerpt that was only a few paragraphs long—that suggested that one could dye natural-fiber yarns with onion skins. Onion skins? Such a humble, yet key, kitchen staple could also be used as a dye? I was immediately hooked on the idea and began collecting them in a paper bag on top of the fridge.

Having no context for how many onion skins would be enough, I saved onion skins for more than a year, till my paper bag was nearly overflowing. (I can only sing the praises of my spouse for his patience with me, as my collecting habits have increased over the years.) It was all worth the wait when I finally created my first onion skin dyebath and saw the results.

At the time, I thought that an acid was needed for the dye to work, so I put all the onion skins in a giant canning pot with several glugs of white vinegar. After straining the onion skins and tossing them on the compost pile, that first dip of fiber into the pot was magical. I was not expecting the bright gold that I pulled out of the pot, so cheerful and solar. I hadn't looked up any results online and had this experience with a fresh eye. Reading that you can "dye yellows, browns, and oranges" with brown onion skins is much different than viewing those colors coming out of a pot. Suffice it to say, there was no going back; I was now a dyer.

GET YOUR FEET WET

There are several things that make onion skins an ideal beginner's dye, and accessibility is the first. If you don't want to wait as your collection at home grows, most grocery stores are happy to let you clean out the onion skins at the bottom of the bin, and I highly recommend outsourcing collection efforts to family and friends. You'll get a communal "Wow!" when you share the results. Both brown (yellow) onions and red onions have outer skins that yield great color. White onion skins don't produce much color.

Onion skins are also kitchen safe, and you can get color using no additional reagents.[1] Simply simmer the skins and add wool. This means that you could use enamel or stainless steel pots already in your kitchen, making onion skins a perfect place to start without needing to invest in equipment. From there, you can explore the addition of mordants and assistants or

Yellow onion skin samples (*from top*): onion skins only, alum and onion skins, alum and onion skin exhaust, alum and onion skins with vinegar, onion skins and iron

modifiers. Some of these compounds are food grade, but as you explore additional reagents, it is always wise to use dedicated dyepots (see safety notes).

While onion skins will dye protein fibers without the help of a mordant, many dyers do use mordants to increase the longevity of the color (fastness) or to extend the range of colors possible. Some of the most common mordants are metallic salts, with several aluminum salts being the go-to mordants for most dyers. You will see many dye recipes call for alum, and food-grade potassium aluminum sulfate is readily available at most natural grocers or where canning equipment is sold. For my samples, I used aluminum acetate, which, while typically used for cellulose fibers, works equally well on protein fiber and was what I had on hand at the time.

Iron salts are also a favorite of natural dyers. Natural-dye specialists Catharine Ellis and Joy Boutrup tell us, "Iron is seldom used as a primary mordant but is more often used in combination with aluminum or as a post-dye treatment to alter color." Iron "saddens" colors by adding gray, which, in the case of yellow onion skins, produces greens. In my samples, I used ferrous acetate, which I obtained by soaking rusty nails in a vinegar and water solution.[2] (Any use of iron requires dedicated dye equipment.)

Mordants and modifiers allow us to expand the colors we can create with our dear onion skins. From food waste alone, shades of brown, orange, gold, yellow, and green can be achieved! The versatility of this dye is partly why it is one of my favorites to this day. I've done a few dips modified in different ways for you to see here.

What You'll Need

- Alum (aluminum acetate or potassium aluminum sulfate)
- Iron solution (ferrous acetate created with nails, vinegar, and water)
- Dried onion skins, whole or crushed
- Enamel or stainless steel pot
- Stainless steel spoon or tongs
- Digital scale

I hope you'll grab a pot, hit up your supermarket, and give it a try! Perhaps you will become as enraptured by pulling color from accessible natural dyes as I am.

THE RECIPES

Make your dye plan based on the materials you have on hand, your experience level, and the colors you wish to achieve. The five steps below can be used in several different ways. The simplest approach is to just follow steps 2 and 4 to dye with onion skins alone. Or you could use steps 1, 2, and 4 to create a range of bright yellows that are progressively lighter with each dip, or 1, 2, 3, and 4 for a range of slightly brighter yellows. Follow steps 2, 4, and 5 for olive greens and browns. Following steps 1, 2, 4, and 5 will create a range of long-lasting greens.

1. Premordant Bath with Alum

Fill a pot with cool water, leaving enough room to add the yarn. Add alum at 15%–20% weight of fiber (WoF). For example, if you are dyeing 100 grams of wool, use 15–20 grams of alum. Add fiber or yarn and slowly bring the pot to just below a slow simmer. This will be around 185°F (85°C), and you will begin to see wisps of steam rise from the water and maybe an occasional bubble. Maintain this temperature for 30 minutes to an hour and allow your fiber to cool in the pot

Madeline created the Kitchen Cast Off Cowl using dye samples. Linen stitch lends itself well to a smooth fabric made from small samples in a sunny palette.

Red onion skin samples (*from top*): onion skins only, alum and onion skins, alum and onion skin exhaust, onion skins and iron, alum and onion skins with vinegar

Safety First

While onion skins can be safely simmered in your kitchen, safety precautions become very important when working with reagents.

- Work outside or in a well-ventilated area.
- Use dedicated dyepots and tools.
- Always use gloves and a mask when working with iron.
- If handling rusty nails or scrap metal, make sure your tetanus booster is current.

overnight. Remember to keep an eye on your dyepot and maintain this low temperature so as not to risk damaging your wool.

2. Onion Skin Dyebath

When dyeing, I tend to start with baths that create colors that are as saturated as possible and then use successive dyebaths to achieve lighter colors. In the case of onion skins, I use 50%–100% WoF depending on the amount of dyestuff I have on hand (and my patience at the time.) As with the mordant step, heat your onion skins in a pot of water to a slow simmer. Maintain this slow simmer for around an hour and let the pot cool with the dyestuff in it overnight. Note that boiling your dyestuff may cause a shift in color. Boiling is one way to get duller yellows on purpose, for example, and other dyes such as madder will go brown with high heat exposure. In the morning, strain out your onion skins.

3. Acid Modifier

If you'd like to try adding in an acidic modifier, do so after you've strained your onion skins from the dye bath but before you add your fiber or yarns. I tend to use white vinegar for my dye baths, adding two "glugs" (about a half cup) to the dye bath and stirring before proceeding to step 4. Citric acid is another common acidic modifier, which can be used at about 5%–8% WoF.

4. Add the Wetted Fiber or Yarn

Whether it was mordanted or not, for even color, fibers and skeins should be soaked and have any excess water

squeezed out before being added to the pot. Repeat the heating process to the same temperature once again, maintain for at least an hour, and then let the fiber/yarn cool in the pot overnight.

5. Post-Dye Treatment with Iron

If you'd like to go for darker browns, or olive green from red onion skins, you'll need some iron to modify your color. If you have access to rusty nails or other rusty hardware of some kind, you can make your own iron solution by putting those items in a jar and adding a 50/50 water and vinegar solution. Give it a shake, let it sit for a few days to dissolve the iron from the nails, and you'll be ready to go!

When using this solution as an afterbath to shift colors, add a bit to a pot of water and heat it slowly with your dyed textile. This method isn't very scientific as far as measuring goes, so remember that a little goes further than you think! Also, iron can and will damage fibers if left too long, so make sure to rinse thoroughly to remove any stray particles.

Finishing

Rinse your dyed fiber or yarn in cool water, adding a bit of pH-neutral soap during a second soak, and remember not to agitate too much. Hang skeins to dry or lay fiber in a spot with good air circulation, and then stand back and admire!

Notes

1. Jenny Dean, *Wild Color: The Complete Guide to Making and Using Natural Dyes* (New York: Watson-Guptill, 2010), 72.
2. Joy Boutrup and Catharine Ellis, *The Art and Science of Natural Dyes: Principles, Experiments, and Results* (Atglen, PA: Schiffer, 2018), 54.

Resources

Albright, Barbara. *The Natural Knitter: How to Choose, Use, and Knit Natural Fibers from Alpaca to Yak*. New York: Potter Craft, 2007.

Madeline Keller-King is a fiber artist and natural dyer who lives in the woods of northwestern Montana in the company of her spouse and family of pups. You can follow her adventures on social media where she goes by @woolywitchofthewest.

Looking for an easy cowl pattern that highlights your colorful handspun odds and ends? *Spin Off* magazine subscribers can log in for your bonus knitting pattern at LT.Media/KitchenCowl.

Detail of the Kitchen Cast Off Cowl

Naturally Beautiful Together

Unite Your Stash with Natural Overdyes

BY DAGMAR KLOS

These eleven samples of handspun yarn are a colorful (if disharmonious) palette.

If you're like me, you have quite a stash, and over time, you may have accumulated some leftovers in the form of fiber, handspun yarn, or both. You probably want to use them up, but some of the colors just might not go together. How do you go about pulling it together into a harmonious project? It's time for overdyeing: layering a color (usually but not always a different color) on fiber or yarn.

The number of times you overdye is up to you. If you're not happy with the resulting color, you can overdye again and again until the desired color is achieved. Don't forget the naturally colored fibers in your stash; they too can be overdyed, yielding rich results. You can overdye with natural dyes or synthetic dyes, but for this article we will explore natural dyes.

First, a little color theory. You probably know that the primary colors are red, yellow, and blue. Secondary colors are green, orange, and purple, which are achieved by mixing blue and yellow, red and yellow, and red and blue, respectively. It is also important to understand the complementary colors, because using a color's complement will tone down and desaturate the original color. Complementary colors come in pairs: red and green, yellow and purple, blue and orange.

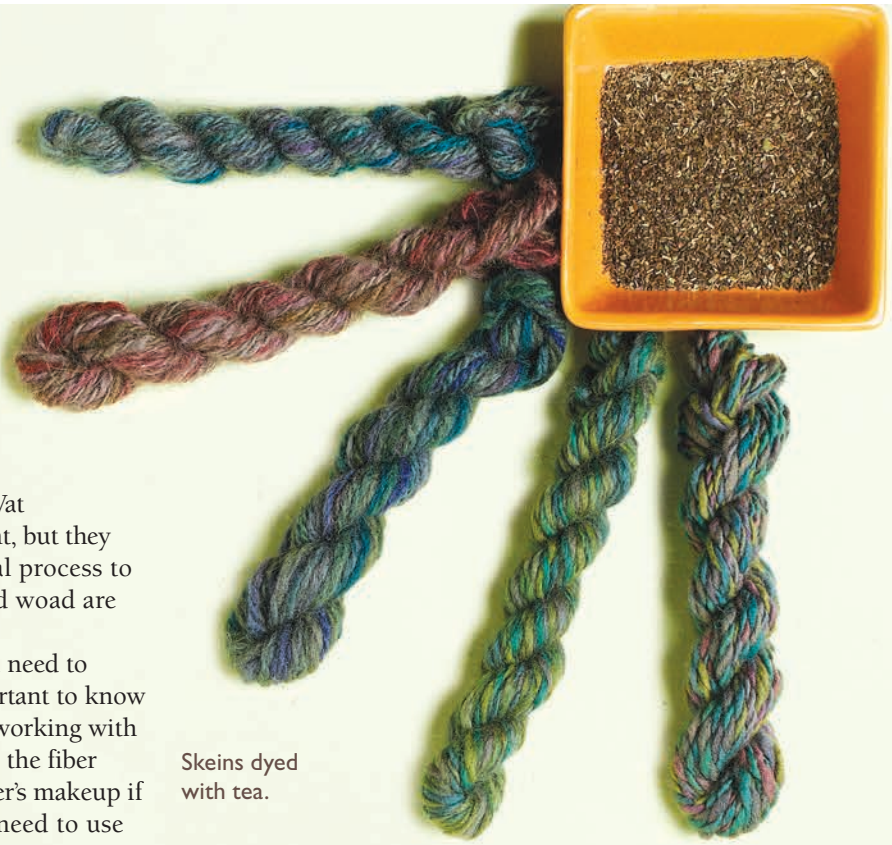
UNDERSTANDING NATURAL DYES

There are three types of natural dyes: substantive, mordant (or adjective), and vat dyes. Substantive dyes,

Photos by Joe Coca

also known as direct dyes, readily impart color without the aid of an auxiliary substance. Substantive dyes are water soluble and include black walnuts, tea (green or black), turmeric, saffron, and onion skins. These dyes have varying degrees of colorfastness. Mordant dyes require the aid of an auxiliary substance known as a mordant that allows the dye to bond with the fiber. In some cases, the mordant improves the colorfastness. The majority of natural dyes are mordant dyes. Vat dyes, like substantive dyes, need no mordant, but they are not water soluble and require a special process to dye the fiber. The blue dyes of indigo and woad are vat dyes.

Besides knowing your natural dyes, you need to know your fiber and your water. It is important to know whether your fibers will felt readily when working with a hot dyebath, and you will need to handle the fiber accordingly. You also need to know the fiber's makeup if you plan to use a mordant dye; you will need to use aluminum sulfate (known as alum sulfate) for protein fibers and aluminum acetate (known as alum acetate) for cellulose fibers. Knowing your water quality is important, especially if you have iron in your water. Iron is known for its ability to sadden or modify color. It will modify the color whether you want it to or not; even chipped enamel pots will leach iron into the dyebath.



Skeins dyed with tea.

Skeins dyed with black walnut (bottom right pair dyed in exhaust bath).

TEA AND BLACK WALNUT: SUBSTANTIVE DYES

Tea is the most readily accessible dye material—you can buy it at the grocery store. I buy the cheapest black tea in bag form and store it with my other dye materials, so I always have it on hand. In the case of the samples here, I dyed about 100 grams in total of various handspun yarns at 25% WOG (weight of goods), or 10 tea bags.

Having been taught to keep good records and measure fiber and dye material quantities by weight, I default to this type of dyeing, but that doesn't mean that you have to.

When dyeing with tea, fill a dyepot with water, add the tea bags, and begin to heat. Soon you will see the tea releasing its color. Heat for about 30 minutes, remove tea bags (or not), add fiber, and simmer for about an hour. Remove

the fiber from the dyebath or let it sit overnight in the dyebath. After removing the fiber from the dyebath, allow it to dry completely before washing. Dyeing with tea makes subtle changes to the fiber by toning down the colors. In addition to black tea, you can dye with green tea, which yields an even subtler change. To accomplish a similar result, dye with coffee. Consider collecting spent coffee grounds to experiment with.

Black walnut is another substantive dye. Having used both black walnut hull dye powder and fresh black walnut hulls, I prefer the fresh. The dye powder seems to be available now only from hair care supply companies. Collect fresh black walnuts while they are still green and freshly fallen, in late summer or early fall, depending on your area. For the samples on page 9, I used fifteen black walnuts.

If you don't plan to dye with the walnuts right away, I recommend freezing them. It is the green hull that you want to use for dyeing. To use fresh or frozen walnuts, place them in a sturdy cloth sack and crack them open with a hammer, separating the hulls from the walnuts; you can always scatter the nuts for the squirrels. When handling black walnuts, it is essential to use gloves to protect your hands from picking up the brown dye, which will happen during the handling phase no matter how many times you wash your hands. One option is to allow the hulls to soak for a period of time: place the hulls into a container, fill it with water, and let the hulls soak for a week or two, allowing the hulls to slowly exude the color.

When you don't have time for a soaking period, separate the hulls from the nuts and crack the hulls into smaller pieces, which will speed up the process. Place a 5-gallon paint strainer (which acts like a large tea bag) into a dyepot, add the cracked hull pieces, and fill the pot with water. Start heating the dyepot and let it simmer for about an hour. The hulls will start releasing color. When you are ready to start dyeing, remove the paint strainer with the hulls and add the fiber. Depending on how light or dark you want the final result to be, continue to simmer for about 30 minutes to an hour, or if starting with a cold dyebath, heat to a simmer and hold for 30 minutes to an hour. Remove the fiber from the dyepot and allow it to dry before washing. You can always repeat the process if it's too light, but once it's dark, it's hard to go back. If there is still color in the dyebath, it can be used again.

Skeins dyed with indigo.

The black walnut dye is a much stronger color than black tea and can quickly overpower the underlying color, although fiber dyed in tea can work nicely in a project with fiber dyed in black walnut.

INDIGO: VAT DYE

Indigo is the perfect dye for overdyeing. In addition to yielding beautiful blues, it is necessary for achieving purples and greens when it comes to natural dyes. Indigo and woad are both vat dyes, meaning that they are not water soluble and require a special process to make the color blue available to the fiber. Vat dyes require an alkaline, oxygen-reduced bath. In this bath, the vat dye changes from its insoluble

Far left, skeins dyed with marigold; near left, samples dyed with cochineal (at a variety of concentrations).

form to its soluble form. In its soluble form, the color attaches to the fiber. When the fiber is removed from the dyebath, the dye oxidizes on the fiber, returning to its insoluble form and blue color. This may sound very intimidating, but don't let that stop you. Indigo does have a mind of its own, but with practice and perseverance, the joy of working with indigo is endless. It never ceases to amaze. Instant indigo is now available on the market, the result of a new processing method that leaves the indigo pre-reduced, making it easy for even the beginner.

There are two types of indigo vats: a chemical reduction vat and a natural fermentation vat. The natural fermentation vat requires more time, from several days to weeks for a vat to be ready, so we'll look instead at a chemical reduction vat made with natural indigo.

I like working with a stock solution, which I prepare before making an indigo vat. For the samples on page 10, my stock solution was prepared using 100 grams of indigo powder that I placed in a 2-liter canning jar. I added a small amount of warm water to the indigo to create a paste which usually takes a minute or two. Next I added about 4 cups of cool water. Carefully, I added 2 tablespoons of lye, an alkali, and stirred to dissolve it. Then I carefully added 2 tablespoons of thiourea dioxide, a reducing agent, and stirred to dissolve it before letting the mixture rest for about 10 minutes. You will know that the stock solution is ready by the color change—it will go from blue to a greenish color.

While the stock solution is resting, I fill a dyepot with fresh water and add between half and a full teaspoon of thiourea dioxide; fresh water needs to be oxygen-reduced to dye. When I am ready to start dyeing, I pour about ¼ cup of stock solution into the dyepot. I start with a tiny skein of yarn or a small scrap of white fabric, immersing for 2 minutes. This will give me a good idea of the depth of color, and I can make any adjustments: less time for lighter color, more time for slightly darker color. With indigo, it's important to build up layers. It's also important to allow time between dips for good oxidation; 30 minutes is a good goal. After achieving the desired shade, allow the fiber to oxidize a minimum of a day or two unless you have dyed protein fibers, in which case you will want to neutralize the fiber in a vinegar bath for 45 minutes to an hour after the final dip. When the fiber is ready to wash, first immerse it in warm water to which a splash of vinegar has been added to neutralize the pH, soak it for 15 minutes, then wash it in hot water with neutral soap. Rinse the fiber until the water is clear.

COCHINEAL AND MARIGOLD: MORDANT DYES

Mordanted overdyeing requires a preliminary step before dyeing: mordanting your fiber or yarn. (If the

The colors that were so unlike in their original form have been united with natural overdyes; each sample includes two overdyed yarns.

fiber or yarn was originally dyed with natural dyes, the mordant would have been applied already, and it doesn't need to be reapplied.) You have two options for dyeing: dried, frozen, or fresh raw dye materials that you have on hand, or dye extracts. There are a number of dye suppliers who sell both raw dyestuff and extracts. Extract simply needs to be dissolved in water and added to the dyepot. With raw dyestuffs, you can either draw out the color and strain out the dyestuff beforehand or you can dye your fiber with dyestuff in the pot.

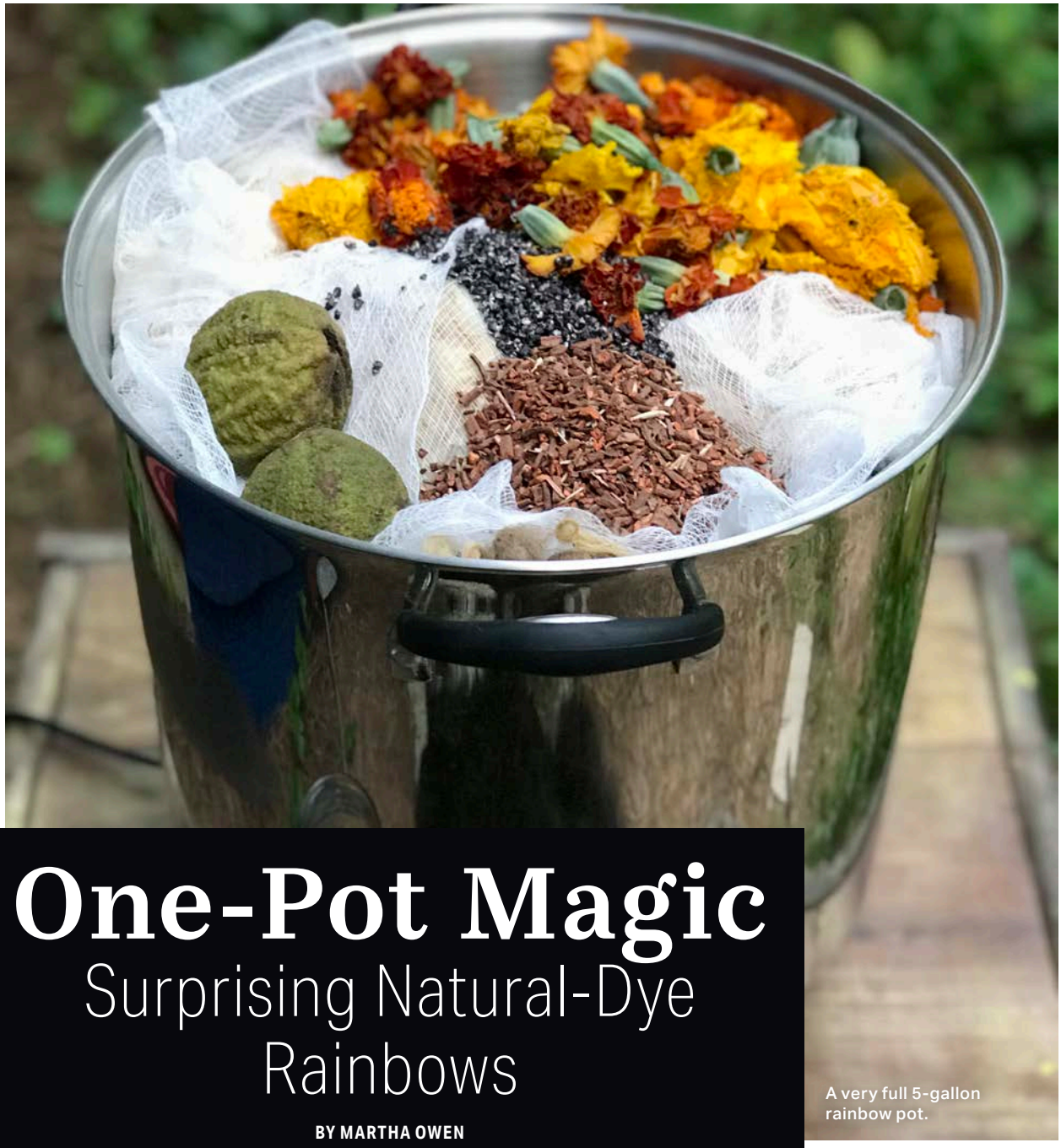
Depending on the time of year, you may be able to go into the garden and dye with fresh flowers, weeds, leaves, and other materials. If you opt to dye your fiber along with the raw dyestuff, I highly recommend containing the dyestuff with a device such as a 5-gallon paint strainer, available at local hardware stores.

To dye the cochineal samples, I followed the supplier's suggested ratio to create a medium value. I dissolved the measured amount of cochineal in hot water, added it to the dyepot, added the samples, and began heating the pot for 30 minutes. Once the pot reached a temperature of 190 degrees Fahrenheit, I held it at that temperature for an hour, then allowed the dyebath to cool down overnight before removing my fiber. Cochineal does its final color development in the cooldown.

The marigold samples were dyed at about 25% WOG. I placed the marigolds into a paint strainer in a small pot and added water to cover the flowers, brought the temperature up to about 200 degrees, and held it there for about 30 minutes to draw out the color. After removing the strainer filled with spent marigolds, I added this marigold tea, also known as dye liquor, to a larger dyepot filled with water, added the samples, and brought the temperature to 190 to 200 degrees over 30 minutes, simmering for another hour. I let the dyed fiber cool overnight in the dyebath, but I could have removed it at this point.

Overdyeing is a great way to integrate colors that may not appear harmonious, allowing you to use up your stash of leftovers for projects. The beauty of natural dyes is that they always (almost always) work well together so that you could probably pair any of these overdyed yarns from any of the dyestuffs and it would look harmonious. It's also a fun way to play with natural dyes and the dye process, so take a carefree, childlike approach and see what great things emerge—you just might be surprised!

Dye master, fiber artist, author, technical editor, and teacher **Dagmar Klos** is the author of *The Dyer's Companion* (Interweave) and numerous articles for *Spin·Off*, *Handwoven*, and *PieceWork*. She served as coeditor and copublisher of *Turkey Red Journal*, a newsletter dedicated to natural dyes.



One-Pot Magic

Surprising Natural-Dye Rainbows

BY MARTHA OWEN

A very full 5-gallon rainbow pot.

Photos by Martha Owen unless otherwise noted

Color has been the most exciting part of my 40-year journey with sheep and wool. I realize there was a time—that I can barely remember—when I didn't spin, and I didn't dye. I enjoyed looking at and using color back then, but when I took my first spinning and dyeing class and pulled my first handspun out of our first dyepot, I realized I had found what I was hungering for: colors that reflect nature.

All the way along, my fiber adventure has been marked by color—from pedestrian to pastel to vivid—which includes fostering a smorgasbord flock of Romney, Corriedale, a bit of Cormo and Bluefaced Leicester, and a pride of Shetland sheep. What quirky, colorful characters.

Somewhere along the road, my sister-in-law, a natural dyer and gardener, showed me how she had arranged chunky natural dyestuffs on fleece in an enamel baby's bath. And she got beautiful spots! I have been running with this idea ever since. What about a dyepot with a variety of natural Shetland fleece colors

and a variety of dyestuffs to create a rainbow of dyed spinning fibers?

DISCOVERING INADVERTENT COLOR

A rainbow dyepot is one-stop dyeing that yields many color possibilities. It is a method that I often teach to students at the John C. Campbell Folk School, and it is a way to get many shades quickly for yarn design experiments.

The idea is simple. Chunky natural dyestuffs, cheesecloth, and mordanted fleece are layered in a dyepot, making a big woolly sandwich: dyestuff, cheesecloth, mordanted wool, cheesecloth, dyestuff, and so on. Very little water is added to the pot, which is placed on lower heat for longer than for a single-color pot. I use natural dyestuffs that are hard and dry, so there must be time for everything to soften and release dye into the mordanted wool. There are concentrations of color around each dye source and blends of colors that occur between the dyestuffs. Colors are more intense and vivid on the bottom of the pot.

If you are new to natural dyeing or are a true scientist, enjoy the exploration of inspirations that come out of a dyepot using several chunky dyestuffs at once. It is an "anything is good" experience. This appeals to me because my personal worldview is to nurture my desire for random and unrepeatable combinations.

Equipment and Materials

- Enamel or stainless steel dyepot
- Long-handled spoon
- Cheesecloth
- Washed, dried, weighed fleece or other protein fiber
- Natural dyestuffs, such as black walnut, madder, marigold, and cochineal
- Alum (potassium aluminum sulfate)
- Cream of tartar (tartaric acid)

How Much Mordant?

Mordants and dyes are typically measured in relation to weight of goods (WOG), in this case, clean, dry wool. For the samples included here, I used the following:

Shetland fleece from Martha's flock weighed and ready to be mordanted.

Photo by Matt Graves

A view of the first layer on the bottom of the rainbow pot.

Cooked and ready to disassemble.

10% WOG alum and 5% WOG cream of tartar. For example, if you want to mordant an ounce of wool (about 28 grams), you will need 2.8 grams of alum and 1.4 grams of cream of tartar.

Start with washed, dried fleece. For the pot shown here, I started with four natural sheep shades. Weigh the fiber and form into loosely tied cheesecloth bundles. The amount of wool you need will depend on the size of your pot. Label each bundle with masking-tape labels and a permanent marker. Soak the fleece bundles in water to thoroughly wet them before they go into the mordant or dyepot.

To prepare the mordant pot, fill an enamel or stainless steel pot with water. There should be plenty of room to stir and move the wool around. Based on the clean wool weight in your bundles, weigh the alum and cream of tartar, and dissolve each one in the pot: alum, then cream of tartar. After dissolving both of the mordants, add the wetted woolly bundles. Let the mordant pot come slowly up to a simmer and hold it there for an hour. Turn off the heat and let the wool cool in the mordant pot, preferably overnight.

Next day, fish out the bundles and soak them one time in a bucket of fresh water of similar temperature. Remove excess water and dye the wet wool now or lay it out to dry. You can dye at any time once the mordant is applied. If the wool is kept in good condition—dry and safe—it just needs to be rewetted when you have time for a dye day or when your flowers are blooming!

How Much Dyestuff?

I confess: I never, ever measure my total amount of dye for a rainbow pot. I set myself a limit for the amount of each dyestuff and don't use any more than that. If I seem to have more than I need when I start making layers, I save it. If I have big undyed areas, it's okay! Anything is good.

However, if you are new to natural dyeing, some general guidelines can help you build your rainbow pot. Dyestuffs, like mordants, are typically measured in relation to WOG. For a pure-color marigold pot, a typical amount would be 100% to 300% marigolds WOG. For madder root, it is 25% to 100% WOG, and for cochineal, it is 1% to 5% WOG. Walnuts? Use a

bunch. Remember that each dyestuff acts differently, but generally, the more dyestuff, the darker the color. Madder and cochineal are rather dear and very powerful, so I use as little as possible to get a good color strike.

Dyepot Setup

Now the excitement builds! Like a good chef, gather your rainbow pot ingredients: dyestuffs, cheesecloth, and wetted mordanted wool. Divide the wool into three fairly equal batches. Now you are ready to start layering. In the rainbow pot shown here, I used marigold, cochineal, madder, and walnuts to dye four colors of fleece.

On the bottom of the pot, place some of each dyestuff. You want a "dump" or pile of each; do not sprinkle. The piles can touch or not. Cover this dry dyestuff with cheesecloth, forming a layer, and fold it back. Now, open all of your woolly bundles, create a multicolor layer of the mordanted wool in the dyepot, and lay the folded cheesecloth over the wool, tucking it in. From the bottom, you've now layered dyestuff, cheesecloth, wool, and cheesecloth.

Using different colors of wool in the pot creates a variegated effect.

Photo by Matt Graves

With a variegated dyepot, card multiple locks together for slow transitions of color, or flick card and spin lock by lock for shorter sparks of color in your handspun skeins.

Photo by Matt Graves

Top: Gradient of rolags (also called rolls or rows) created using dyed Shetland from the rainbow pot with light gray and black natural colors. *Bottom:* Gradients of rolags created with undyed and dyed moorit Shetland (*left*) and undyed and dyed white and black Shetland (*right*).

Photo by Matt Graves

Continue adding layers in this way until you have used up your supplies or until the pot is nearly filled. Add water by dribbling a small amount down the side of the pot. You have enough water when you can just see the pot's water level when pressing down on the whole woolly pile with a long-handled spoon. There shouldn't be very much water because you don't want the dyes to mix or the wool to float. Keep poking the layers with a spoon to look for the water and add a little more as needed. Put the dyepot on medium heat. This is warm enough; you are not in a hurry now. Do not stir. You can poke but do not stir.

After at least an hour, check the colors on the top layer of your pot and press down with a long-handled spoon to ensure there is still liquid in the pot. When you are convinced that the colors look good (about three hours for my pot), carefully disassemble the contents of the magic pot. This is best done when it is cool. Try not to drop the loose dyestuffs into the fleece layers, but if you do, the dyestuffs are chunky, so much of it will shake out.

If you have a spin dryer, place the freshly dyed fleece in it and put a small bucket under the downspout. Save any brightly colored dye water to pour back into the dyepot. There are other adventures still to be had! Carefully rinse the freshly dyed fiber a time or two and lay it flat to dry. Take a picture! While it dries, make a cup of tea and have a good think about all the possibilities for your beautiful fleece.

Resources

All dyestuffs except cochineal were collected in the Cory Brown Memorial Dye Garden at the John C. Campbell Folk School in Brasstown, North Carolina. Learn more at folkschool.org.

Dean, Jenny. *Wild Colour: How to Make and Use Natural Dyes.* London: Mitchell Beazley, 1999.

Martha Owen is a resident artist in spinning, knitting, feltmaking, dyeing, and surface design at the John C. Campbell Folk School in Brasstown, North Carolina. Her adventure in spinning and natural dyeing began at this very school in 1978. Since 1980, Martha's extended family has included sheep, Angora rabbits, and Great Pyrenees and border collies. Also a banjo player and storyteller, Martha's interest in sheep, wool, music, and dance has carried her joyfully around the world. Her children say she is a wool nerd, but her sheep say she is outstanding in her field! Learn more at folkschool.org and on Instagram @marthaowenwoolens.

