

Making Lake Pigments

What are Lake Pigments?

Nearly everything you see contains chemical compounds called pigments that give things their color. From the brown melanin in our hair and skin, to the green chlorophyll in grass, to the brilliant blue of lapis lazuli, everything gets its color from somewhere. Humans have been trying to recreate the colors we see around us for millennia. Precious pigments were traded alongside spices, gems, and metals and used in dye, paint, or applied directly to the body as the earliest forms of cosmetics. One of the most famous pigments, Tyrian Purple was made from sea snail slime and was worth more than gold!

Today we are able to synthesize pigments in labs, but for most of history people had to extract pigments from the world around them. One particular process to do this is called Laking which creates Lake Pigment. The process works by taking whatever plant matter you want to extract pigment from, and creating a dye by boiling it. But that's not the pure powdered pigment we want! In this form the pigment is water soluble, meaning it can be dissolved in water to create a solution. In order to get our powdered pigment we have to separate it from the water.

To do this we add a mordant, an inert, colorless powder, to the dye. Historically that mordant might have been chalk, white clay, crushed bone, or what we'll be using, Alum or aluminum sulfate. Then an alkaline solution, such as sodium carbonate, also called soda ash or potash is added to the dye and reacts with the acidic alum. There's a lot of complex chemistry happening here that will vary based on the particular substance used to make the dye, and what chemical reagents you're using.

In simple terms, the acidic and alkaline solutions react with each other in a way that allows the alum to "grab" the pigment from the water. After that all the liquid can be strained out, the pigment is left to dry, then it's ground into a fine powder, and added to a binder to create watercolor, oil paint, crayon, and more!



A Note On Safety

Many of the substances involved in this process are toxic, so it is important to take steps to protect yourself while making your pigments. Gloves should be worn while handling the dye and chemical reagents. Safety goggles and a respirator should be used while handling the powdered reagents and powdered pigment. Any tools used in this process like pots, measuring cups, spoons, aren't safe to use for food.

Ingredients and Tools

- Plant matter (dandelions, onions skins, acorns etc.)
- Alum (Potassium aluminum sulphate)
- Washing soda/soda ash (sodium carbonate)
- Mortar and pestle, or coffee grinder
- Funnel or sieve
- Coffee filters or cheese cloth
- A pot to boil plant matter
- Jars or other vessels
- Measuring cups and spoons
- Gloves (rubber solvent gloves or nitrile gloves)
- Respirator mask



Instructions

Make Dye From Plant Matter

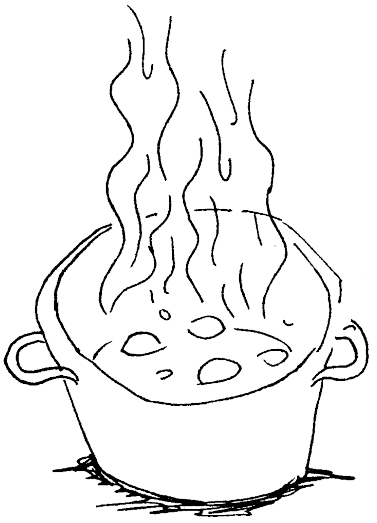
• Put your plant matter in a pot, add water until all plant matter is covered. You want the dye to be as concentrated as possible, so take care not to add more water than just enough to cover your plants.

• Simmer for 1-3 hours.

• Allow dye to cool (ideally overnight.)

• Place your coffee filter or cheesecloth in your funnel/sieve, strain out all solids.Squeeze as much liquid from your filter as possible. You should be left with a colored liquid.

• At this stage you can add different chemicals like the iron or copper acid to manipulate the color of your dye.



Note:

Some plants contain pigment compounds that are sensitive to heat, and will need to have the dye extracted at lower temperatures. They may also eventually fade from exposure to light and heat. These are called fugitive pigments.

Add Alum

• Add the dye back into a pot, simmer dye for 30-40 minutes, do not allow it to come to a complete boil. Let it cool a bit, it should still be warm.

• Measure out 5 tsp of alum per 100ml of dye, mix into 5 tsp of boiling water, add to dye.

• Optional: Transfer dye to a glass jar or other clear container so you can watch the pigment settle to the bottom after adding soda ash. Make sure to leave room in the container for when the mixture foams up in the next step.

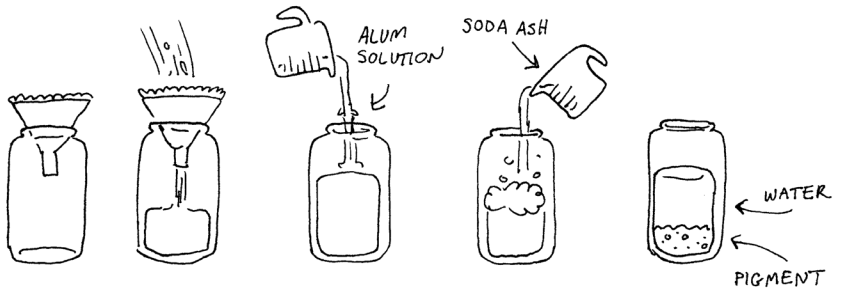
Add Soda Ash

• Measure out 2.5 tsp of soda ash per 100ml of dye.

• Dissolve into a small amount of hot water.

• Slowly add the solution to the dye. The acidic alum and alkaline soda ash will neutralize each other, and produce quite a bit of foam.

• Let the solution sit, you will see the pigment, now separated from the water, settle at the bottom. This liquid can be spooned off the top of your container, or left to be filtered in the next step.

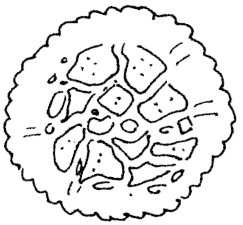


Filter and Wash the Pigment

• Place a fresh coffee filter or cheesecloth in your funnel/sieve.

• Start slowly pouring the liquid through the filter, it may take a while to fully filter.

• Pour distilled water into a clean container, add the filter with pigment to it, stir so the pigment is released from the filter. Allow to settle and strain again. Repeat. This step is important to remove any botanical residue remaining in the pigment that may impact its longevity.





Dry and Grind Pigment

• Lay the filter flat somewhere warm, away from direct light to dry.

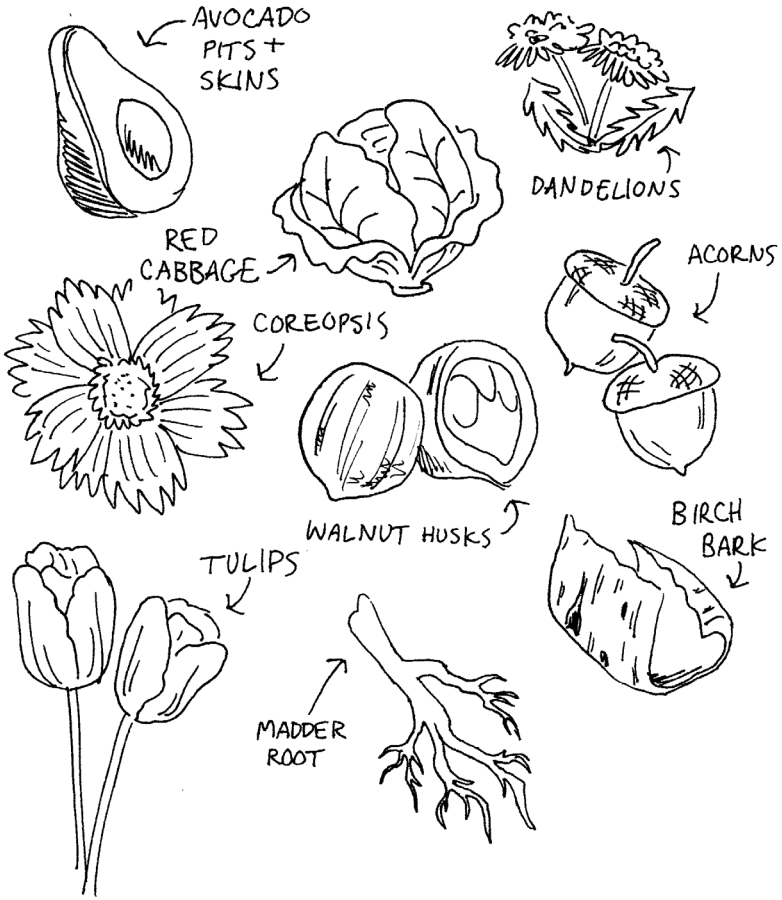
• Once the pigment is totally dry, remove it from the filter and grind with a mortar and pestle or coffee grinder until it becomes a fine powder.

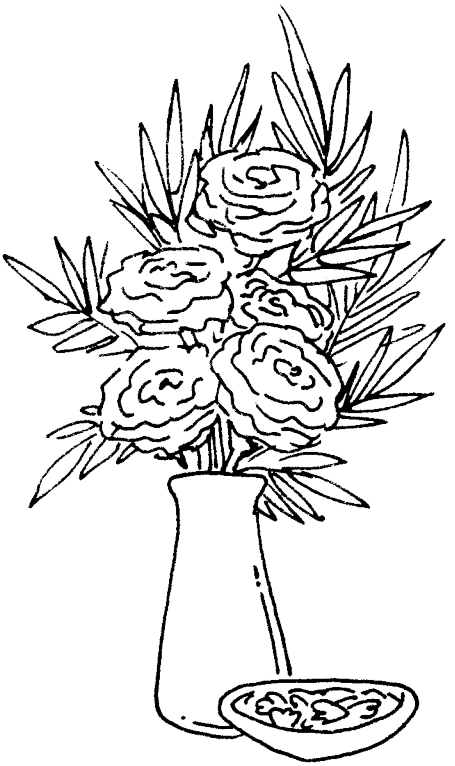
• From here you can use gum arabic to make watercolor paint, linseed oil to make oil paint, or melted beeswax to make crayons.



What Else Can You Lake?

The short answer is so much! Once you have the process down you can experiment with all kinds of natural materials. In medieval Europe the primary pigments came from madder, woad, and weld which made red, blue, and yellow respectively. Eventually indigo would replace woad as the main source of blue. You're not just limited to plants either! You might go to an art supply store and see a bright red paint called carmine, and that pigment was traditionally made from the shells of cochineal insects! Your kitchen is full of potential pigments too! The onion skins and coffee grounds in your compost bin can make you beautiful yellow and brown. Beets, avocado shells and pits, and red cabbage are also options. The possibilities are as open as your mind.







Made in 2026 by Ari Mulch
for The Garfield Park Conservatory and Gardens