

DYEING AND PAINTING WITH NATURE: THE CHEMISTRY OF COCHINEAL

MAKING LAKE PIGMENT WITH COCHINEAL

Recipe for cochineal lake from the “Paduan Manuscript,” (anon., Venice, late 16th-17th c)

Mary P. Merrifield, *Medieval and Renaissance Treatises on the Arts of Painting: Original Texts with English Translations* (1849, Dover Publications, 1969), pp. 701-702

Un altra sorte di lacca fina. - R. Piglia 12 grani di cocciniglia, o grana fina fatta in polvere, si pone in due oncie di lissivio lasciandola in infusione due hore incirca poi si cola per pano lino, e si mette sopra cenere calda, quando vorrà bollire vi si aggiunge quanto due piselli d'allume di rocca in polvere, quando il liscivo farà schiuma grossa incarnata all' hora si getta tutto in un panno lino steso, e passerà il lissivo chiaro restando la schiuma nel panno, quale si fa seccare, e si fa tavolette.

Another sort of fine lake. Take 12 grains of powdered cochineal or fine grana, add to it 2oz of ley; leave the infusion for about 2 hours; strain it through a linen cloth and put it over hot cinders; When it boils add to it pulverized roche alum of the size of 2 peas then the ley will make a thick red scum; as soon as this happens throw it all onto a stretched linen cloth, when the clear ley will pass through leaving the coagulum on the cloth, which coagulum must afterwards be dried and made into tablets.

In the lab, two modernized versions of this recipe:

1. “Standard”

a. *Extraction of cochineal in potash, precipitation of pigment with alum*

2. “Standard Reversed”

a. *Extraction of cochineal in alum, precipitation of pigment with potash*

Recipes adapted from Jo Kirby et al, *Natural Colorants for Dyeing and Lake Pigments: Practical Recipes and their Historical Sources* (Archetype, London, 2014)

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RECIPE 1: "Standard"	
1 - Mortar & pestle	1 - Filter
1 - Hot plate	300ml - Water - for alum (large beaker)
1 - Large beaker (at least 1000ml)	50ml - Water - for potash (smaller beaker)
1 - Small beaker (at least 100ml)	1 - Drawstring bag
1 - Pair of chopsticks or other stirring device	0.24g - Cochineal
1 - Thermometer	10g - Alum
1 - Funnel	4g - Potash

Procedure:

- Grind cochineal in mortar and pestle
- Using a small utensil, add cochineal to the drawstring bag. Close the bag tightly
- Add potash and cochineal to 300ml water in the 1000ml beaker
- Bring to a boil and boil for 15-20 min
- Using heat, dissolve 10g alum in 50 ml water in the 100ml beaker
- Warm the colored solution to about 50 °C and add alum solution very gradually, stirring. Do this slowly and incrementally, checking the pH of the solution after each addition until a pH of 6-7, there is no further effervescence, and precipitation of the lake pigment appears to be complete
- Allow the solution to settle for at least 15min (ideally overnight)
- Pour solution through filter in a funnel
- Once the liquid has drained through, wash the pigment: discard the filtrate and place funnel+filter over a clean container. Pour 100ml of clean water through the filter. Repeat until the filtrate is clear
- Allow the pigment to dry on the filter (at least overnight), then scrape off and use

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DYEING AND PAINTING WITH NATURE: THE CHEMISTRY OF COCHINEAL

RECIPE 2: "Standard - Reversed"	
1 - Mortar & pestle	1 - Filter
1 - Hot plate	300ml - Water - for potash (large beaker)
1 - Large beaker (at least 1000ml)	50ml - Water - for alum (smaller beaker)
1 - Small beaker (at least 100ml)	1 - Drawstring bag
1 - Pair of chopsticks or other stirring device	0.24g - Cochineal
1 - Thermometer	10g - Alum
1 - Funnel	4g - Potash

Procedure:

- Grind cochineal in mortar and pestle
- Using a small utensil, add cochineal to the drawstring bag. Close the bag tightly
- Add alum and cochineal to 300ml water in the 1000ml beaker
- Bring to a boil and boil for 15-20 min
- Using heat, dissolve 10g potash in 50 ml water in the 100ml beaker
- Warm the colored solution to about 50 °C and add potash solution very gradually, stirring. Do this slowly and incrementally, checking the pH of the solution after each addition until a pH of 6-7, there is no further effervescence, and precipitation of the lake pigment appears to be complete
- Allow the solution to settle for at least 15min (ideally overnight)
- Pour solution through filter in a funnel
- Once the liquid has drained through, wash the pigment: discard the filtrate and place funnel+filter over a clean container. Pour 100ml of clean water through the filter. Repeat until the filtrate is clear
- Allow the pigment to dry on the filter (at least overnight), then scrape off and use

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