



NATURAL COLORS

FABRICATING A COLOUR PALETTE

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Dedication:
... To Janeth. The basis to create as many colors as you have always wanted.

INTRODUCTION TO NATURAL DYES

- **Natural dyes** are pigments or dyes from vegetal, mineral or other organism origins.
- Most natural dyes are from **plant origins** and encompass a large range of fruits and berries, seeds, roots, bark, leaves, and flowers.
- Making natural dyes and pigments with local resources has been a part of human culture since approximately 5000 years ago.
- Synthetic dyes were introduced to the textile industry in 1856.
- They seemed like a good solution to uniform, colorfast, bright colors
- They are inexpensive
- The use of these dyes, in mass production for fast fashion especially, is the cause of the most water pollution in any industry, after agriculture.
- These dyes are toxic and most of them never degrade in water.
- Others degrade and cause harmful, toxic and carcinogenic substances as they decay.
- The scum layers of this dye waste in water cause turbidity that prevents photosynthesis of water flora and promotes acidity and toxicity in water sources.
- A reassessment of these harmful practices re-discovery of the potential and importance of conscious and sustainable dyeing within the textile industry is a necessary paradigm shift for the 21st century.

NATURAL MATERIALS FOR DYES

Not all natural materials will produce a dye, and some produce colors that are nothing like the original plant it came from. Here's a list of colors and the plant material that will give you shades in that color.

- **Orange:** carrots, gold lichen, onion skins
- **Brown:** dandelion roots, oak bark, walnut hulls, tea, coffee, acorns
- **Pink:** berries, cherries, red and pink roses, avocado skins and seeds (really!)
- **Blue:** indigo, woad, red cabbage, elderberries, red mulberries, blueberries, purple grapes, dogwood bark
- **Red-brown:** pomegranates, beets, bamboo, hibiscus (reddish color flowers), bloodroot
- **Grey-black:** Blackberries, walnut hulls, iris root
- **Red-purple:** red sumac berries, basil leaves, day lilies, pokeweed berries, huckleberries
- **Green:** artichokes, sorrel roots, spinach, peppermint leaves, snapdragons, lilacs, grass, nettles, plantain, peach leaves
- **Yellow:** bay leaves, marigolds, sunflower petals, St John's Wort, dandelion flowers, paprika, turmeric, celery leaves, lilac twigs, Queen Anne's Lace roots, mahonia roots, barberry roots, yellowroot roots, yellow dock roots

Excerpt from:

Maslowski, Debra D (2018) Natural Dyes for Fabric: All Natural Ways to Dye Fabric Different Colors. In: DIY Natural. <https://www.diynatural.com/natural-fabric-dyes/>. Accessed 20 Oct 2018

NATURAL MATERIALS FOR DYES



PREPARE DYE BATHS

- All natural dyes stemming from organic materials have different extraction methods.
- For the purpose of this colour palette we will use:
 - Rose Petals: freshly plucked for vibrant color (3 red roses)
 - Blackberries: slightly mushy/ripe (1 half pint)
 - Red Cabbage: fresh or salvage/old (half a head)
 - Avocado: pits and skin will give you different shades, you may choose to use them separately or together for a richer color (4 – mix of skin and pits)
 - Carrots (3 full sized)
 - Curcuma: powder, you may choose to simmer curcuma root instead, this will take longer and will vary the shades/strength of colour (3 tbsp)
 - Spinach: fresh leaves (large bunch)
 - Black beans: dried (250 grams) COLD DYE
 - Walnuts: brown shells (100 grams), you may use the black walnut fruit if you find it locally for dark inks, you may also experiment using the nut itself.

Tips:

- Soak beans, walnut shells and carrots overnight (do this with firm materials)
- Use twice as much water as materials and let the water come to a boil, then simmer for an hour minimum, asses the colour depth and allow to simmer longer if you wish to extract more colour
- Black beans are used only in a cold dye bath; meaning only the soaking water for the beans will be used as dye
- Clean avocado skins and pits thoroughly to get a clean dye (it may look more brownish if there are green bits of fruit in the pot)
- Strain well all of your dye baths to get the most uniform color baths
- Do not use the same pots you use in your kitchen for cooking edibles to dye fabrics, use a separate set of pots and utensils

PREPARE DYE BATHS



PREPARE FABRICS + FIBRES

- Select your fibres: Fibres from vegetal and animal sources work best with natural dyes. Synthetic blends may take some colour but not all blends will and if they do the colour will be much lighter.
 - Vegetal: Cotton, bamboo, ramie, linen, hemp, jute, pineapple, etc
 - Animal: Wool (sheep, angora, cashmere), silk, camel, alpaca, mohair
- Scour fibres: wash sizing off from commercial fabrics (strip of oils); with each option submerge fully your fabric and allow to simmer for 30 minutes to an hour, stir occasionally.
 - Use a 1tsp to 1L ratio of soda ash or sodium carbonate (vegetal)
 - Use 1 tsp for your whole water ratio (animal)
 - Use a ph neutral soap (hypoallergenic or soap for babies works)
- Mordant fibres: you can mordant before or after dyeing the fabric with slightly different results, allow fabric to fully soak in the mordant solution
 - Salt for acidic dye matter: dissolve 1 : 16 parts water (less effective, more accessible)
 - White vinegar: blend 1 : 4 parts cold water
 - Alum: 8% to WOF (weight of fabric)
 - Copper or iron sulfate: 1% to WOF
- PH modifiers (produce reaction causing colour changes in shade and hue):
 - Acidic: vinegar or lemon juice (orange or yellow tones)
 - Alkaline: soda ash (various shades)
 - Copper (blue tones)
 - Iron (dark hues, orange and blue tones)



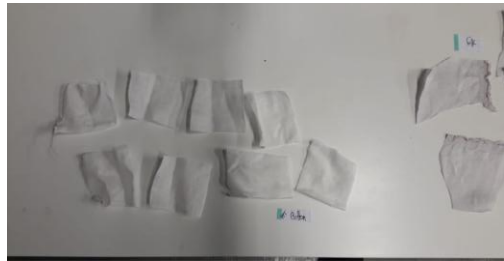
1. Choose the type of fibre (Animal or Vegetal)



2. Weigh your fabrics and fibres



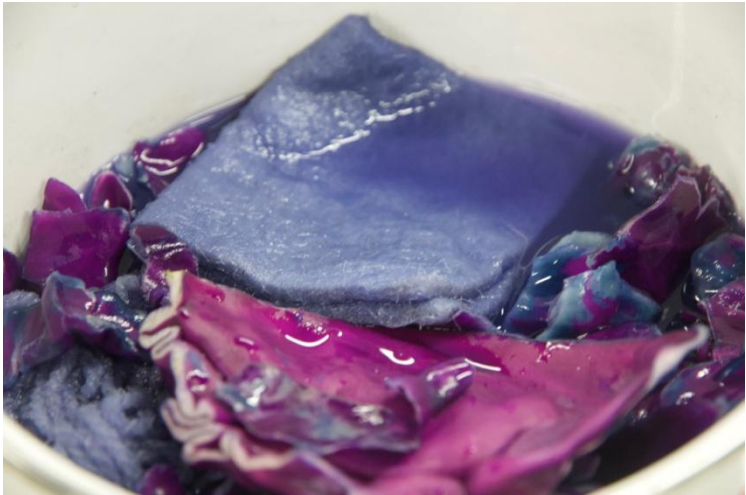
3. Scour: Simmer to strip of sizing / oils



4. Cut fabrics into small swatches

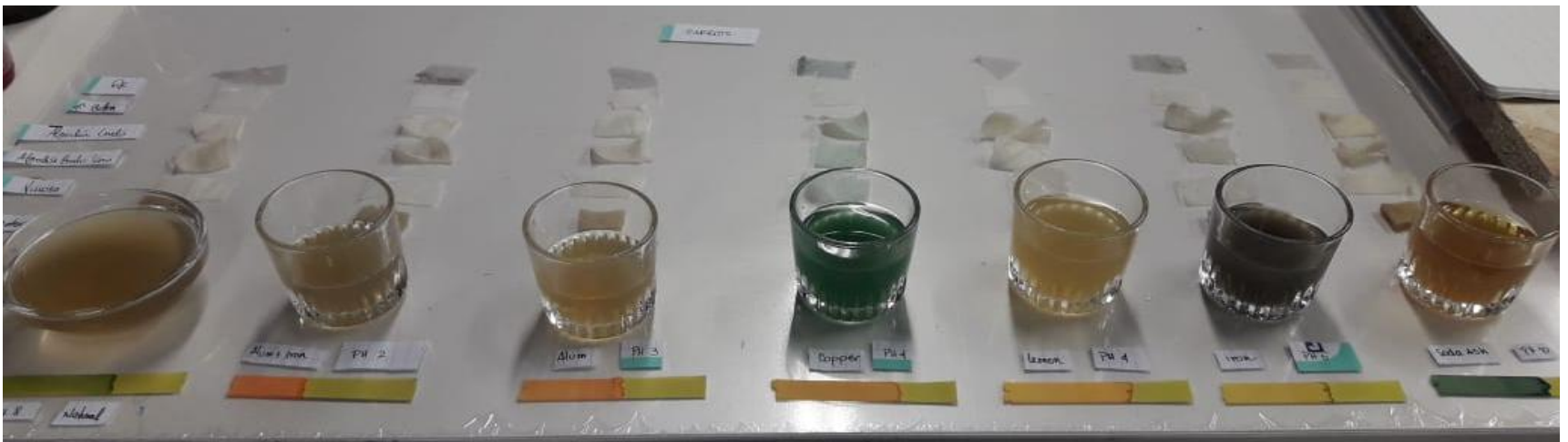
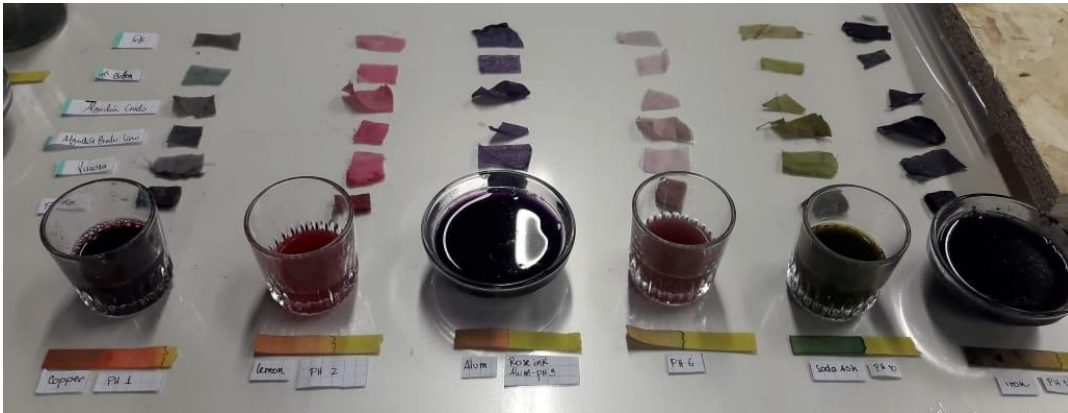


5. Weigh + Lay out swatches for each colour



6. Fully submerge fabric in dye bath.
Allow to simmer in low heat – beware some fabrics will shrink with heat

7. Play with ratio of dye to pH modifier. Use a pH strip to measure the changes throughout. Record your results.



NATURAL COLOR SWATCHES

This collection of swatches is the result of experimentation and manipulation of pH levels of natural pigments to create various hues and shades of inks and dyes using fruits and vegetables on natural fibers and fabrics.

The Natural Color Swatches Book is made for every designer or creative, as a recipe guide for finding and creating natural hues for product development.

How to use this book?

Choose a color swatch for your project. Identify the fruit or vegetable it is derived from at the top of the page, then note the pH modifier and the fabric which was used to achieve the color. Weight the fabric you wish to dye, depending on this weight use a 1kg fabric ratio to 10 liters of water. For a stronger shade, use less water to extract color and create a dye bath. The percentage of mordant and pH modifiers used to create these swatches is as follows:

- 8% Soda Ash
- 8% Alum
- 8% Copper
- 1% Iron Sulfate
- 20 Drops of Lemon per 250ml water

Preparation:

First, clean the fabric using 15% Soda Ash in a pot with warm water enough to cover the textile. Then in another pot heat the water you measured for the dyeing up to 90-95°C. Add the fruit or vegetable and let it release the color. For avocado use the peels and the pits. Then add the PH modifier and mix it until the color is homogeneous. Add the fabric and let it as long as possible. When it is done, take it out from the water and let it dry. The longer you wait to wash your textiles, the longer you will let the color cure.

Fabrics= Silk, cotton prepared to dye (PTD) Raw cotton linen, Row cotton, PINATEX

Fruits and Vegetables= Blackberry, Rose Petals, Red Cabbage, Curcuma (Power), Black beans, Spinach, Carrots, Avocado, Walnuts Shell

Rose Petals.

SILK [100%]

[PPT] COTTON

RAW COTTON

RAW COTTON [LINEN]

VISCOSE

PIÑATEX



NATURAL PALETTE
PH: 6

ALUM
PH: 3

ALUM + IRON SULFATE
PH:

IRON SULFATE
PH: 12

COPPER
PH:

LEMON
PH: 2

SODA ASH
PH: 10

Blackberry

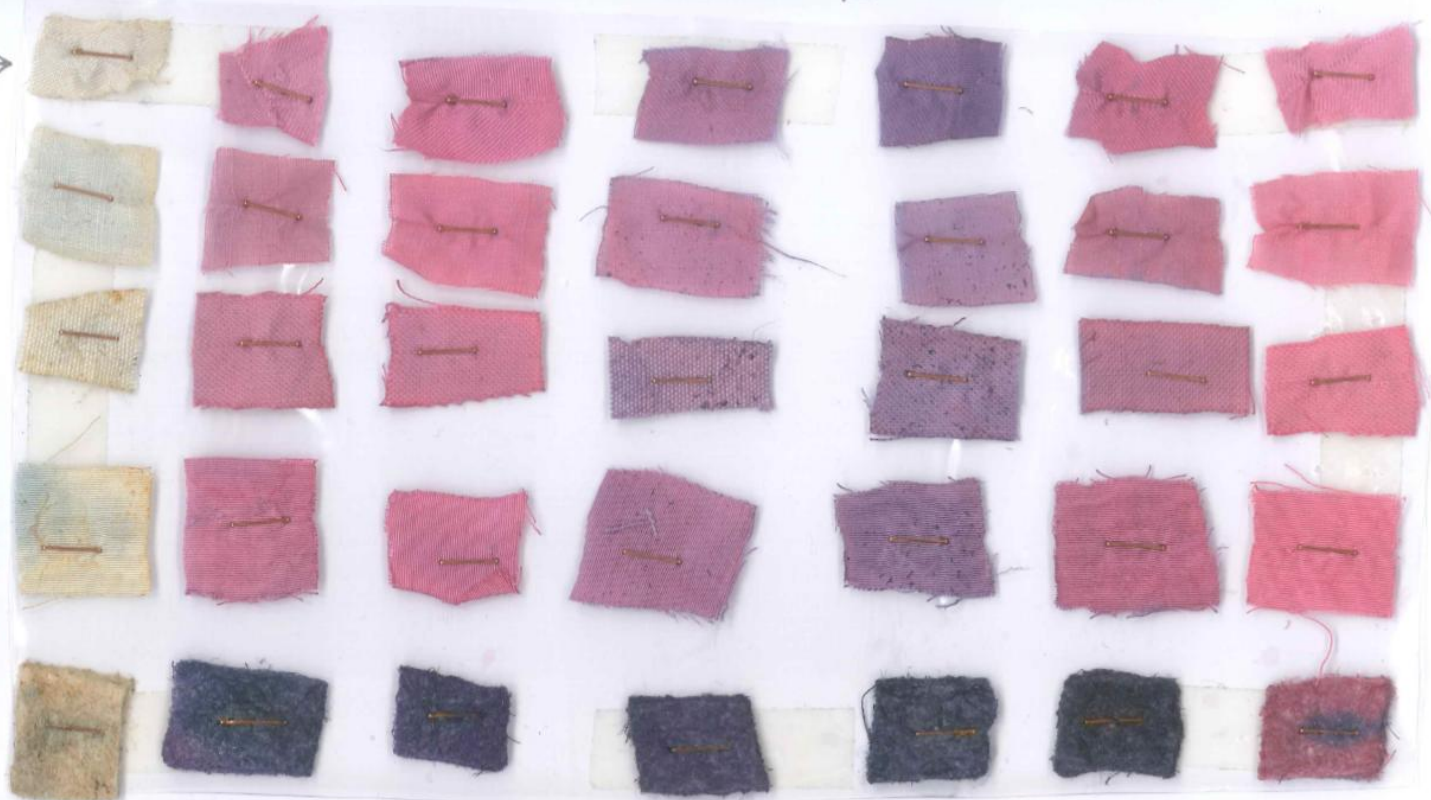
SILK 100% →

[PPT] COTTON →

RAW COTTON
[LINEN]

VISCOSE →

PIÑATEX® →



NATURAL
PALETTE
PH: 7.2

ALUM
PH: 3.1

ALUM +
IRON
SULFATE
PH: 3.1

IRON
SULFATE
PH: 6.3

COPPER
PH: 7.1

LEMON
PH: 3.2

SODA
ASH
PH: 10

Red Cabbage.

	NATURAL PALETTE PH: 8	ALUM PH: 2	ALUM + IRON SULFATE PH: 2	IRON SULFATE PH: 6	COPPER PH: 5	LEMON PH: 3	SODA ASH PH: 10
SILK 100% →							
PPT] COTTON →							
RAW COTTON [LINEN] →							
VISCOSE →							
PIÑA TEX © →							

Avocado.

<p>SILK 100% →</p>							
<p>[PPT] COTTON →</p>							
<p>RAW COTTON [LINEN] →</p>							
<p>VISCOSE →</p>							
<p>PIÑA TEX® →</p>							
	<p>NATURAL PALETTE PH: 7</p>	<p>ALUM PH: 3</p>	<p>ALUM + IRON SULFATE PH: 3</p>	<p>IRON SULFATE PH: 5</p>	<p>COPPER PH: 4</p>	<p>LEMON PH: 3</p>	<p>SODA ASH PH: 10</p>

Carrots.

	NATURAL PALETTE PH: 1	ALUM PH: 3	ALUM + IRON SULFATE PH: 2	IRON SULFATE PH: 4	COPPER PH: 4	LEMON PH: 4	SODA ASH PH: 10
SILK 100%							
[PPT] COTTON							
RAW COTTON							
RAW COTTON [LINEN]							
VISCOSE							
PIÑATEX®							

Curcuma.

	NATURAL PALETTE PH: 8	ALUM PH: 4	ALUM + IRON SULFATE PH: 3	IRON SULFATE PH: 3	COPPER PH: 4	LEMON PH: 3	SODA ASH PH: 14
<u>SILK 100%</u> →							
[PPT] COTTON →							
<u>RAW COTTON</u> →							
<u>RAW COTTON [LINEN]</u> →							
<u>VISCOSE</u> →							
<u>PIÑATEX (E)</u> →							

Spinach.

SILK 100% →

[PPT] COTTON →

RAW COTTON →

RAW COTTON
[LINEN] →

VISCOSE →

PIÑATEX[®] →



NATURAL
PALETTE
PH:

ALUM
PH:

ALUM +
IRON
SULFATE
PH:

IRON
SULFATE
PH:

COPPER
PH:

LEMON
PH:

SODA
ASH
PH:

Blackbeans.

<u>SILK 100%</u> →							
<u>[PPT] COTTON</u> →							
<u>RAW COTTON</u> →							
<u>RAW COTTON [LINEN]</u> →							
<u>VISCOSE</u> →							
<u>PIÑATEX®</u> →							
	NATURAL PALETTE	ALUM	ALUM + IRON SULFATE	IRON SULFATE	COPPER	LEMON	SODA ASH
	PH: 7	PH: 4	PH: 4	PH: 6	PH: 5	PH: 3	PH: 10

Walnuts Shell.

SILK 100% →

[PPT] COTTON →

RAW COTTON →

RAW COTTON
[LINEN] →

PINATEX® →



NATURAL
PALETTE
PH: 5

ALUM
PH: 3

ALUM +
IRON
SULFATE
PH: 3

IRON
SULFATE
PH: 4

COPPER
PH: 3

LEMON
PH: 2

SODA
ASH
PH: 10