Workshop no.3

A Colourful New Story

Natural Dyes Edition

Don’t let your textiles go to waste workshop series

Contents

Above: Hibiscus Dyed Fabric Swatches, Cor Botanicals.

1.
Who Are We?

TextileLab Amsterdam x Cor Botanicals

TextileLab Amsterdam is a research lab that experiments with craftsmanship, heritage, technology, digital fabrication, and bio-technology. We believe in collaboration, transparency, process, collective intelligence and knowledge sharing, in order to push the boundaries of the textile and clothing industry.

Cor Botanicals co-creates with the living properties of colour to give garments new life. It is an ecosystem that enhances connections between humans and nature by weaving together ancient craft, biology, circular fashion, colour intelligence, fashion activism, and experimental research. We recover second hand garments and upcycle them with colour sourced from local ingredients like plants and vegetable waste from kitchens.

Pictured above (from left to right):

Beatriz Sandini
Co-founder Cor Botanicals
Concept Developer and Designer TextileLab Amsterdam

Bela Rofe
Co-founder Cor Botanicals
Independent Artist and Researcher

waag technology & society

COR Botanicals

REFLOW

Textiles have been a critical and polluting industry since the Industrial Revolution – each year, 14,000 tons of textiles are thrown away in Amsterdam only. The Amsterdam Pilot will increase the recycling percentage of home textiles, through redesigning diverse methods for collection with citizens, while providing feedstock for the recycling industries.

Within the REFLOW project, the Amsterdam Pilot aims to bring the local textile flow from linear to a circular model.

One of our goals is to increase the clothing life-cycle through empowering you to become a circular change maker!

Mismatching socks? Holes in your jumper? Holes in your favourite jeans? Stained shirt?

Help us stop this waste and get all the value out of your old clothes and textiles! Become a circular hero by joining a series of online workshops and learn how to mend, repair and colour your clothes to give them a new life. The workshops can be visited separately and you do not require any particular skills.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement number 820937.

Discarding Textiles

Did you know that every year about 70% of all discarded textiles in Amsterdam end up in the wrong bin and get incinerated? And this corresponds to about 9 thousand tons of textile burned to ashes!

You can contribute to recycling and reusing of textiles by properly addressing your discarded textiles. Check the link from Amsterdam city hall on where to find the designated textile bins.

Where to throw away your used textiles

City of Amsterdam clothing collection information

Some extra information on circular economy and proper textile discarding in Amsterdam:

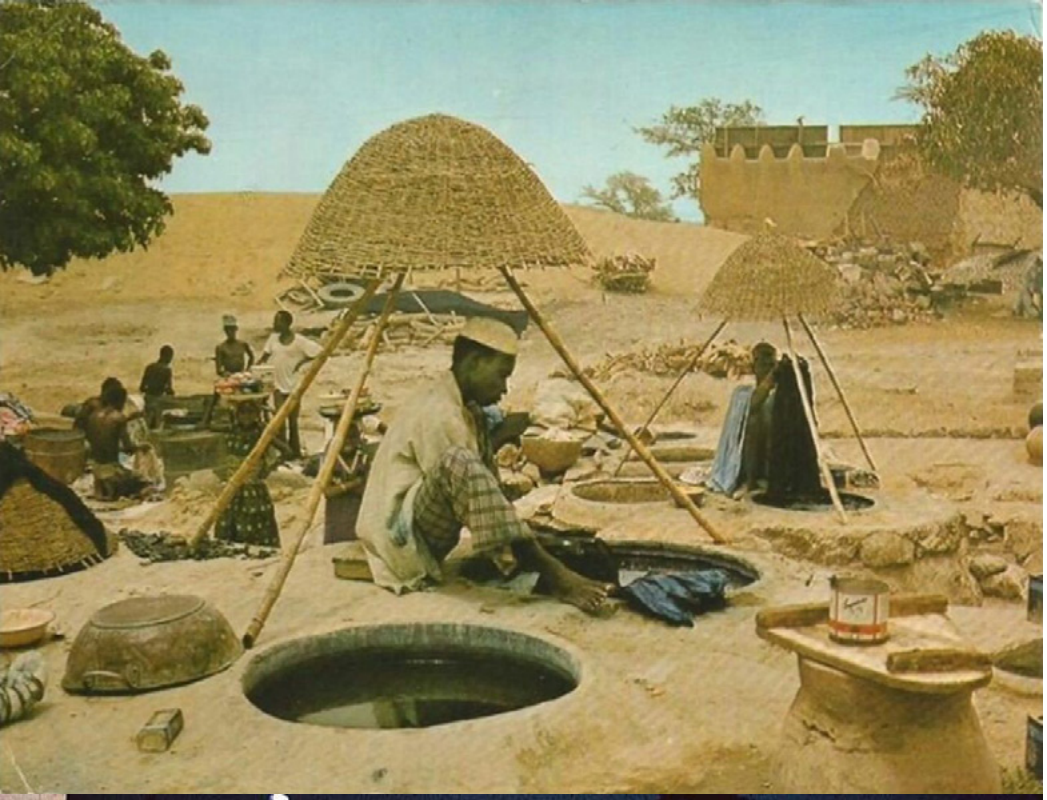
Video (in Dutch)

The Amsterdam based Partners of the REFLOW project are the city of Amsterdam, Pakhuis de Zwijger, Metabolic, BMA-Techne and Waag.

Reflow

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement number 820937.

Above: Piles of Clothing in Panipat, Priya Ahluwalia.



2.

History of Textile Dyeing & Fashion Industry Issue

Traditional Dyeing Techniques

Traditional techniques of dyeing were through **natural processes**.

Natural dyes are organic, living, and non-standardised colours derived from nature. Because of this, their colour fades over time.

Until the mid 19th century, colour came entirely from natural sources, like plants and minerals. This practice created a deeper connection between local communities and their environments. The textiles industry we know today was founded upon this harmonious collaboration between human and nature.

Over 15,000 years ago our ancestors were using natural pigments to decorate the walls of caves, however, dyes were a more complex process so their history is not so easy to track.

Archaeology indicates that dyes from natural sources have been used to colour textiles for at least 6,000 years. So we have a lot to learn from history.

It is important to understand that we are not developing anything new with natural dyeing, it is a heritage technique that we are unlocking from the past to accelerate towards an ecologically responsible fashion industry.

Above: Aztecs of Mexico Undergoing Natural Dye Production, Diego Rivera.

Industrial Dyeing Techniques

Industrial techniques of dyeing are through **chemical-based or synthetic processes.**

Synthetic dyes are inorganic, standardised colours derived from harsh chemicals. Because of this, their colour lasts forever.

There was a departure away from natural dyes around 1856 when an English Chemist, William Perkins, accidentally created the first synthetic dye. Perkins had been using hydrocarbons in coal tar for his experiments in synthesizing quinine when by chance, he developed a deep purple color. This aniline dye was called Mauve, and from the same basis he could develop many other chemical-based dyes, leading to a new era of synthetic dyes over natural dyes.

Synthetic dyes are produced in larger amounts, in a faster time, and at a cheaper cost compared to natural dyes. So industries quickly shifted to investing in them. Today, the environmental and social costs have been enormous.

Above: Textile Wastewater Dumped Into Turag River in Bangladesh, 2018, Getty Images.

Fashion Industry Issue

Today, fashion and textile items have become extremely affordable. Up-cycling our garments through traditional techniques like natural dyeing no longer appeals to the majority of consumers who have given way to the sirens of fast-fashion. However, technology has provided a transparent perspective about the harsh conditions that fast-fashion garments are produced in, giving rise to the slow-fashion movement and revaluing tradition as ancient wisdom and regenerative technique.

Chemical-based colour comes at an enormous environmental and social cost, and it is the fashion industry who is largely responsible for the damage. Water pollution and the poor health of living species and ecosystems are two main consequences of the fashion industry's investment in certain types of chemical-dyeing processes.

Water Pollution & Waste Streams

Fashion is responsible for up to one-fifth of industrial water pollution. The industry uses around 200 tonnes of water per tonne of fabric, enough to fill 37 million Olympic swimming pools (Ellen MacArthur Foundation). Dyeing is the most polluting and energy-intensive process involved in making our clothes. So why is colour – this fundamental component of fashion production – allowed to pollute water systems throughout the world?

The answer is because wastewater disposal is rarely regulated in the areas of the world where the dye factories are located. Meaning the cheapest and/ or only way for factories to get rid of unusable, toxic wastewater is to dump it into nearby rivers and lakes. These hazardous chemicals do not break down as they enter rivers, then oceans, and thus, endanger sea life and communities who rely on these water sources. The injustice around unregulated waste streams is that the dye factory owners and western brands, who outsource the majority of their manufacturing in these areas, are left unaccountable, although they are the main culprits.

Above: Detox My Fashion Campaign, Greenpeace.

Fashion Industry Issue Cont.

Health

Textile-polluted waterways are a risk to human, animal and plant health and are directly linked to fevers, gastrointestinal problems and skin diseases from people washing their hands and faces in the water.

The textile waste stream affects the food chain, as chemical water is used to irrigate crops, causing textile dyes to leak into soils and make their way up the food-chain into vegetables and fruits we eat. Chemicals and heavy metals build up in the body which increases the risk of serious illnesses and decreased life expectancy.

Although this information can come at a shock, it is important to understand that not all synthetic dyes are bad, there are specific categories that are more dangerous than others. So one way to take action and fight for this cause would be to question or ask the brands that you wear to add dye information on their tags.

Natural dyeing can play a positive role in reducing water pollution, health risks and social injustice. It creates an opportunity to rethink our relationship with the clothes already in our wardrobe, and the brands we want to support.

Above: Indigo Dye Workers India, KMA Exports.

3.

Natural Colour Sources & Fibres

Sources of Colour in Nature

Natural dyes are extracted from 3 main natural sources; plants, animals, and minerals. Almost any plant will produce some colour, but the requirements for a good dye plant include the strength and reasonable permanence of the colour. The dye must also be resistant to washing and light.

PLANT

FLOWERS
STEMS
LEAVES
BARK
WOOD
FRUITS

ANIMAL

INSECTS
MOLLUSKS

ORGANIC

MINERAL

SOIL
ROCKS
SALTS
METALS

INORGANIC

Above: Logwood Dyed Silk Shirt, Cor Botanicals.

Fibres - Natural, Artificial and Synthetic Fibres

I. NATURAL FIBRES

Made from plant, animal or mineral extracted fibers.

E.g. **COTTON – LINEN – HEMP – JUTE (VEGETABLE) WOOL – ALPACA – SILK – CASHMERE (ANIMAL)**

Pros:

- The fibers are very intertwined, but extremely breathable and soft.
- Usually extracted without the use of toxins or chemical processes harmful to the environment.
- All natural fabrics are biodegradable.
- Easy to recycle via mechanical recycling.

Cons:

- Higher production costs, especially compared to synthetic fabrics.
- Land, water and pesticide intensive farming activities.
- The characteristics are static, that is, we cannot improve them without adding chemical additives.

II. ARTIFICIAL FIBRES

Natural raw materials are transformed into fibres through chemical processes.

E.g. **MODAL – LYOCELL – BAMBOO – VISCOSE – RAYON – VEGETABLE SILK**

Pros:

- The natural raw material makes them less harmful to the environment than the petroleum in synthetic fabrics.
- They maintain the main characteristics of natural fabrics unaltered: resistance and breathability.
- Production and retail costs are lower than natural fabrics.

Cons:

- When not certified, they use chemical processes that are harmful to the environment.
- All involve chemical processes, wastewater and electricity.
- The chemicals are absorbed by our skin.
- Difficult to recycle, need chemical recycling technique.

Above: Alder Buckthorn Berry Dyed Viscose Shirt, Cor Botanicals.

Above: Madder Root Dyed Cotton x Elastane Shirt, Cor Botanicals.

III. SYNTHETIC FIBRES

Derived from synthetic materials and mostly made up of petroleum waste.

E.g. **NYLON – POLYESTER – ELASTANE (SPANDEX) – POLYURETHANE – NEWLIFE – ECONYL**

Pros:

- Very low production and sale costs of the final product.
- It is easier to make several variations of the same product.
- The characteristics of the synthetic fabric can be improved thanks to the chemistry.
- High weather resistance.
- Not attacked by moths and molds.
- Can be recycled via mechanical recycling (PET into Polyester, via shredding, melting and extruding)

Cons:

- Synthetic fabrics are considered one of the main factors triggering pollution, from their microplastics.
- Depending on the fabric it can lack breathability. It facilitates the proliferation of bacteria and requires frequent washing.
- Not biodegradable and this is causing serious problems with landfill space.
- Cause allergies and skin problems.
- Often natural fibres are combined with synthetic fibres resulting in fabrics with mixed composition, which creates a big problem for recycling once separating the fibres. It is a complex, energy consuming and costly process.

Natural & Artificial Fibres - Animal & Vegetable

Different fibres have different relationships with natural dyes. In the practice of natural dyeing we only focus on **natural and artificial fibres**. This is because they absorb natural dyes best. The fibres have a natural ability to bond strongly with the mordant and dye, unlike synthetic fibres. The reason fast fashion brands choose to fabricate their garments in synthetic fibres, is so they can please the consumer with quick, cheap and disposable fashion. There are two main categories for natural and artificial fibres, these are animal and vegetable fibres.

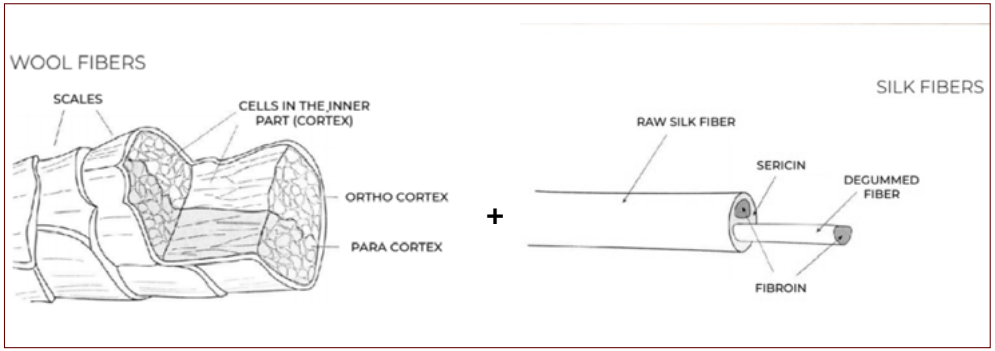
ANIMAL/ PROTEIN FIBRES

Animal fibres consist largely of proteins.

Generally they are the easiest to dye, creating bright bold colours.

The proteins within them are ready to absorb and react both acids and alkaline, but they also can create strong bonds with the mordants which then is able to bind with the dyes.

WOOL - ALPACA - SILK - CASHMERE - ANGORA - CAMEL



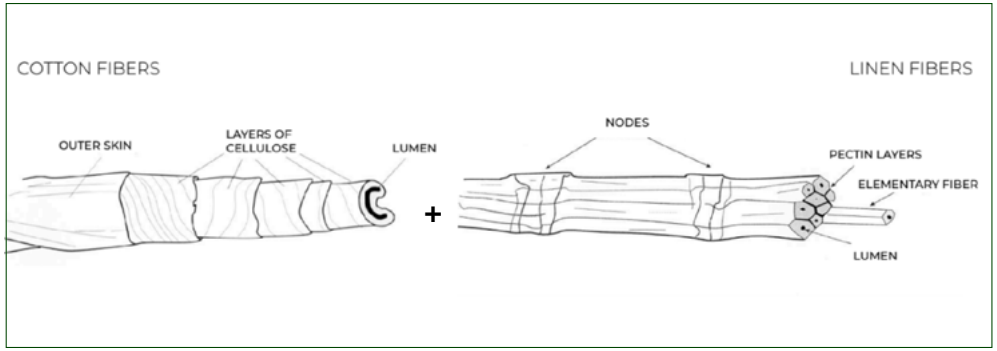
VEGETABLE/ CELLULOSE FIBRES

Vegetable fibres consist of cellulose.

They are harvested from plant materials, such as seed balls, stems, barks and wood.

Cellulose fibres do not always bond with mordants, therefore they are often also combined with tannins.

COTTON - LINEN - HEMP - JUTE - BAMBOO - SISAL - VISCOSE



Above: Fibre Diagram by BioChromes, Cecilia Raspanti.

4.

Material Kit Explained

Kit Contents

We prepared the ultimate starter kit for upcycling your loved clothes. Inside your box you will find all the necessary tools to start this journey on natural dyeing.

Contents:

- Mix of Fabric Swatches and Yarns
- Pipettes
- Petri Dishes
- Dyes (30g - 50g each)
  - Madder Root Extract
  - Logwood Extract
  - Henna
  - Cutch
  - Oak Apple

- Mordants & Modifiers (50g each)
  - Alum
  - Iron Sulfate
  - Sodium Carbonate (Soda Ash)

Links to Buy Ingredients:

- Verfmolen De Kat
- Meaningful Crafts

Henna

Binomial Name: Lawsonia Inermis

What: Tropical Flowering Plant | Leaves

Native To: Africa, Asia, India

Colour Variations: Khaki, Gold, Brown

pH: Low Sensitivity

Fact: *Henna was originally used for its cooling properties for people living in hot desert climates. A paste would be made, for hands and feet to be soaked in to regulate body temperature (5000+ years ago)*

HOW TO DYE WITH HENNA –

Mordanting: Use alum mordant at 15% WOF for both vegetable and animal fibres.

Dyeing: 40% - 60% WOF of henna. Add powder directly to dyebath. Simmer fibres in dyebath for 1 - 2 hours until reaches desired colour. Leave overnight for darker tones. * *Works only in hot dyebath.*

Above: Henna Colour Board, Cor Botanicals.

Madder Root Extract

Binomial Name: Rubia Tinctorum

Other Names: Rose Madder, Dyes Madder, Common Madder

What: Herbaceous Flowering Plant | Root

Native To: Africa, Europe, India, Japan, South East Asia, Turkey

Colour Variations: Orange, Pink, Purple, Red

pH: High Sensitivity

Fact: *Madder is one of the most ancient dyes. A madder dyed belt was found in Tutankhamun's grave.*

HOW TO DYE WITH MADDER ROOT –

Mordanting: Use alum mordant at 15% WOF for both vegetable and animal fibres.

Dyeing: 35% - 100% WOF of madder. Add dye to pot and cover with water. Bring up to about 60°C and hold for 1 hour (do not let temperature exceed 72°C). Add fibres and continue cooking for another 1 - 2 hours. Leave overnight for darker tones. ** Works in hot or cold dyebath.*

Above: Madder Root Colour Board, Cor Botanicals.

Oak Apple

Binomial Name: Quercus Infectoria

Other Names: Oak Gall

What: Oak Tree x Wasp Larvae | Galls

Native To: Mediterranean, West Asia, Netherlands

Colour Variations: Beige, Black, Grey

pH: Low Sensitivity

Fact: *Oak Tree's produce galls as a defense against the sting of gall wasps. The tree excretes a tannin-rich substance that becomes hard and forms a gallnut.*

HOW TO DYE WITH OAK APPLE –

Mordanting: Oak apple is a clear tannin and does not add a tone to fabrics or yarns. It is used as a pre-mordant before adding iron sulfate.

Dyeing: 10% - 15% WOF of oak apple. Simmer for 1 hour. Let cool then strain off tannin liquid. Soak fibres overnight in dyebath. Dilute iron sulfate and pour little by little into dyebath until reach desired colour.
** Works in hot or cold dyebath.*

Above: Oak Apple Colour Board, Cor Botanicals.

Cutch

Binomial Name – Acacia Catechu

Other Names – Betel Palm, Cetachu, Kher, Cutchtree, Black Cutch

What – Thorny Acacia Tree | Heartwood

Native To – India, Burma, Peru, Indonesia

Colour Variations – Cinnamon Brown, Chocolate Brown, Grey

pH – Low Sensitivity

Fact – *The heartwood and bark of Cutch Tree's were used as traditional medicines to treat a sore throat and gastro.*

HOW TO DYE WITH CUTCH –

Mordanting: Use alum mordant at 15% WOF for both vegetable and animal fibres.

Dyeing: 15% - 30% WOF of cutch. Dissolve cutch in boiling water and add it to dyebath. Simmer for 2 hours. Leave overnight for darker tones.
** Works in hot or cold dyebath.*

Above: Cutch Colour Board, Cor Botanicals.

Logwood

Binomial Name: Haematoxylum Campechianum

Other Names: Blackwood, Bloodwood, Bluewood, Campeche

What: Flowering Tree | Heartwood

Native To: Brazil, Central America, India, Madagascar, Mexico

Colour Variations: Blue, Grey, Purple, Violet

pH: High Sensitivity

Fact – *Logwood extract was one of the valuable dyes from the New World. Spain and England went to war over regions that were lush with logwood trees in order to control the lucrative logwood dye trade.*

HOW TO DYE WITH LOGWOOD –

Mordanting: Use alum mordant at 15% WOF for both vegetable and animal fibres.

Dyeing: 1% - 2% WOF of logwood. Make a paste with dye extract and a drop of hot water. Fill dye pot with water and add the logwood extract paste. Stir until dissolved. Add fibres and bring dyebath to simmer. Leave to simmer for 30 min - 1 hour. Stir occasionally. Leave overnight to cool. ** Works only in hot dyebath.*

Above: Logwood Colour Board, Cor Botanicals.

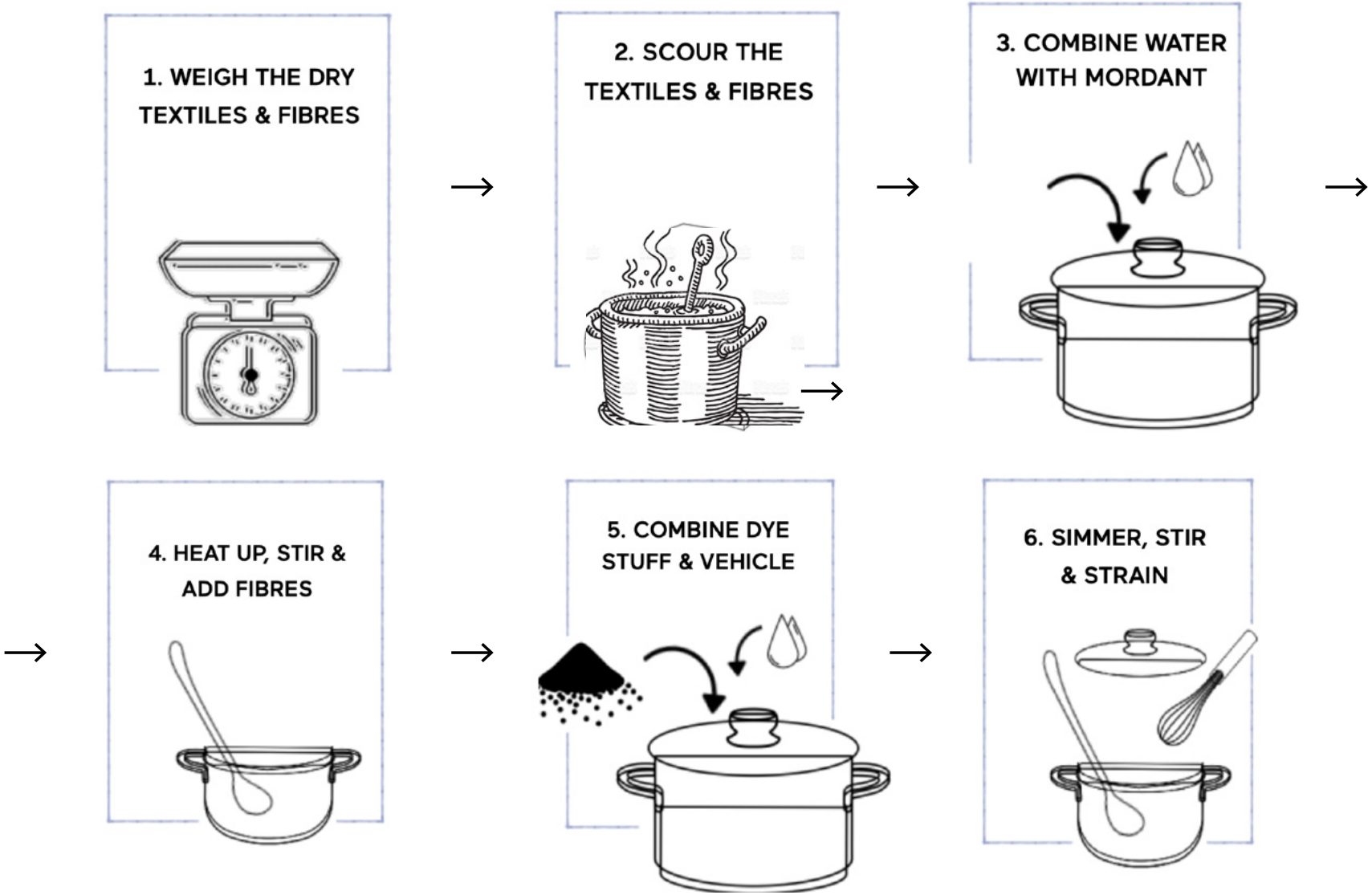
Documenting Your Experimentation

A template for your fabric swatches is provided in the kit. This is where you can begin to document your results, and create a colour archive of your natural dyeing experiments. These fabrics are off-cuts from second hand garments provided from @theswapshop_nl in Amsterdam. They have already been scoured, mordanted and dried. This means that they are ready to be submerged in a dyebath. Here are some examples of the fabric swatch template completed.

6.
Basic Natural Dyeing Process

An Overview of the Natural Dyeing Process

A brief overview of the natural dyeing process from beginning to end. These simple steps are provided as a reference for when dyeing garments.



Mordants

Mordants are substances that are used to fix a dye in the fibre. When combined with a dyebath they improve the light- and wash-fastness of the dye colour, therefore it's durability. Below are common types of mordants used for natural dyeing.

ALUM

Potassium Aluminium Sulfate
[KAI(SO4)H2O]

The most used mordant, suitable for both protein and cellulose fibres. It enhances the dye colour.

Not toxic but harmful if ingested. Handle with gloves and discard diluted in water down the drain.

IRON

Ferrous Sulfate
[FeSO4]

Suitable for both protein and cellulose fibres. Protein fibres can feel rough afterwards so use minimal iron and low heat.

Not toxic but harmful if ingested. Handle with gloves and discard diluted in water down the drain.

OTHERS

COPPER

SOY MILK

RHUBARB

SYMPLOCOS PLANT

Different levels of toxicity, always check reliable sources before experimenting.

Modifiers

These are substances applied to extend the number of shades possible with one dyebath. Colour modifying takes place after the dyeing process. Some dyes are pH sensitive, meaning they will react through colour, depending on the level of acid or alkaline added to the dyebath. Just like us, dyes have preferred environments in which they thrive or not, so through pH experimentation you will learn how the dyes react. With some dyes the colour change is dramatic, with others, it is subtle and soft. The modifiers we apply are either acidic, alkaline or iron.

ACIDIC

Vinegar, Lemon, Citric Acid

Tends to make warmer shades

[PINKS, REDS, ORANGES]

ALKALINE

Sodium Carbonate

Tends to make cooler shades

[BLUES, PURPLES]

IRON

Ferrous Sulfate [FeSO4]

Tends to make darker shades

[DARK BROWNS, GREYS, BLACK]

7.

Step-By-Step Natural Dyeing Process

Set Up Work Space

Working with natural dyes is similar to cooking, therefore it is recommended that you set up for your natural dyeing session where you have access to a table or bench top, stove-top, hot running tap water, and a sink. When using mordants and iron modifier please use pots and spoons separate from your kitchen-ware to avoid contamination.

In addition to this, the following tools are required:

- Kit
- Old Sheet OR Table Cloth (to protect surface you're working on)
- Medium – Large Pots
- Metal Mixing Spoon
- Teaspoons
- Small Bowl OR Cup (for mixing)
- Measuring Cup
- Scissors & Scale
- Gloves
- Acidic Modifier (White Vinegar OR Lemon Juice)
- Pen

Above: Preparing Workspace for Natural Dyeing Session, Cor Botanicals.

Safety Recommendations

Above: Colour Modifying, Cor Botanicals.

- WHEN USING MORDANT OR IRON AS MODIFIER, WEAR GLOVES & USE EQUIPMENT EXCLUSIVELY FOR DYES AND NOT FOR COOKING, TO AVOID CONTAMINATION.
- THOROUGHLY WASH MORDANT & IRON UTENSILS & POTS TO AVOID STAINING THEM.
- DISPOSE OF IRON BATH OR IRON SOLUTION DOWN THE DRAIN IN MUNICIPAL AREAS OR IN A SEPTIC SYSTEM. DO NOT DISPOSE IN WATERWAYS, LAKES OR STREAMS.
- WORK IN A WELL VENTILATED AREA.
- WEAR GLOVES AND BLACK CLOTHING TO PREVENT STAINS.
- 'NATURAL' DOES NOT ALWAYS MEAN SAFE TO SMELL, EAT, TOUCH.

Preparing Vegetable/ Cellulose Fibres

Vegetable and animal fibres have slightly different preparation methods. Here is a visual reference of simple steps about how to prepare your vegetable/ cellulose fibres before a dyebath. The pre-treatment of fibres is the most important part of the dyeing process because it determines how successfully they will absorb the dye.

WOF (weight of fibres) will be used to determined the amount of scouring, mordant and dyestuff used in the next steps

Scour with neutral detergent at 1% WOF
+
Soda Ash at 1% WOF

(Scouring can take place in a pot or in washing machine at 90°C)

10% - 15% of WOF of Alum

Preparing Vegetable/ Cellulose Fibres – Scouring

Step-by-step references to help you with the pre-dyeing fabric treatment.

STEP 1.

Start by weighing the amount of dry fibres, this will be the WOF.

In this example: the t-shirt WOF is 190 g.

STEP 2.

Measure 1% of WOF of Soda Ash and 1% of WOF of neutral detergent and place in a pot with sufficient water to cover all your fibres.

In this example: 2 g of Soda Ash and 2 g of neutral detergent were used.

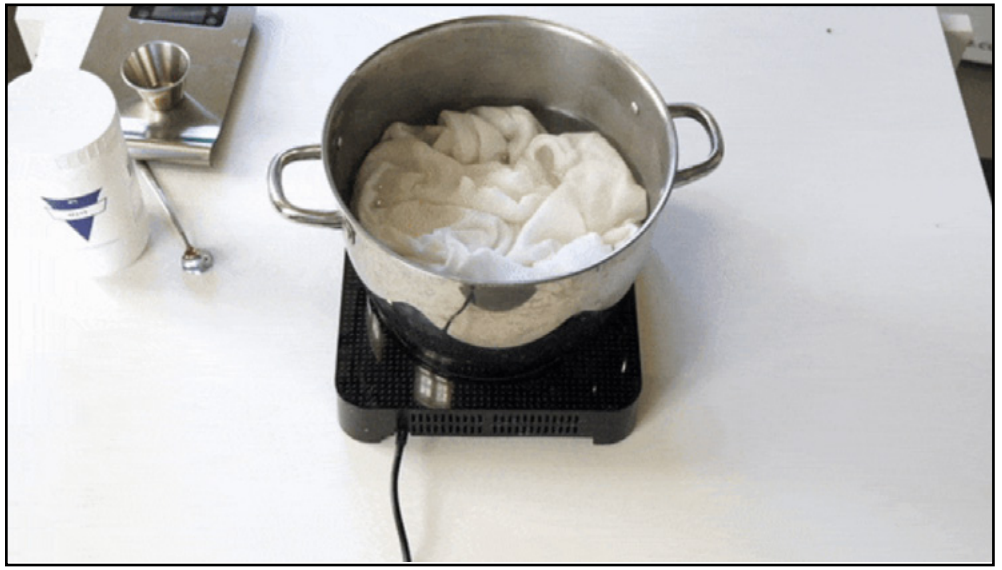
Preparing Vegetable/ Cellulose Fibres – Scouring Cont.

Step-by-step references to help you with the pre-dyeing fabric treatment.

STEP 3.

Turn the heat on, add the fibres and set the temperature to 100° C.

(Alternatively this step can be done in the washing machine using the 90° C program).



STEP 4.

Leave the fabric in the pot for about 1 hour. At the end of this process, the water might be a light yellow colour. This is the result of the dirt and waxes coming out of the fibres, if the water colour is dark, repeat the scouring process again.

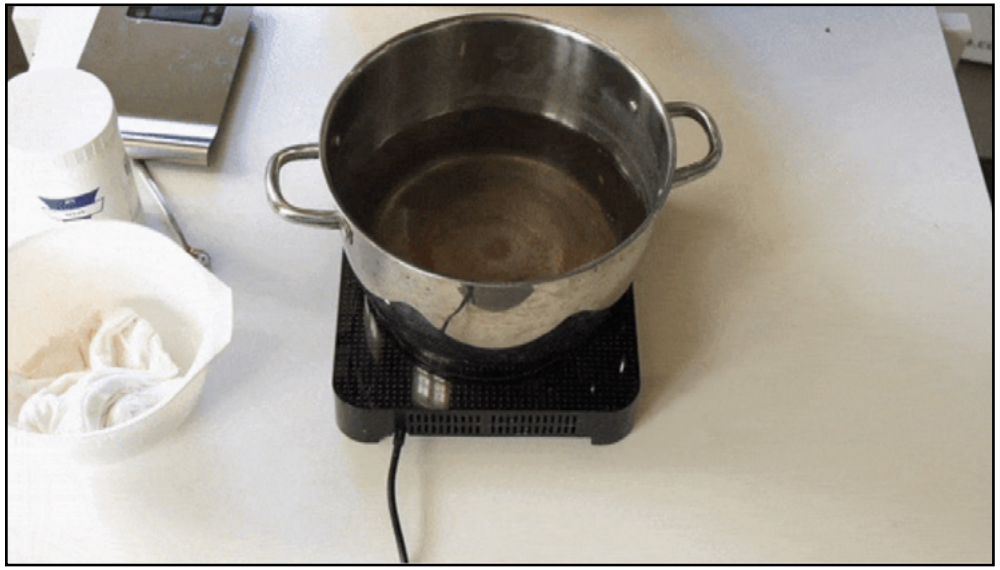
Preparing Vegetable/ Cellulose Fibres – Mordanting

Step-by-step references to help you with the pre-dyeing fabric treatment.

STEP 1.

Given the initial WOF, measure 15% of WOF of Alum.

In this example: the t-shirt WOF is 190 g, so the Alum quantity used was 28,5 g.



STEP 2.

Add the Alum to a pot with sufficient water to cover the fibres, turn the heat on and set the temperature to 100° C. Place the fabrics in the pot and leave there for 1 hour.

Preparing Animal/ Protein Fibres

Vegetable and animal fibres have slightly different preparation methods. Animal fibres are very sensitive, so always take care with temperature. The process for wool and silk is also different. Here is a visual reference of simple steps about how to prepare your animal/ protein fibres before a dyebath. The pre-treatment of fibres is the most important part of the dyeing process because it determines how successfully they will absorb the dye.

WOF (weight of fibres) will be used to determined the amount of scouring, mordant and dyestuff used in the next steps

Clean the fibres with a gentle hand wash and neutral detergent if needed

WOOL: 15% - 20% of WOF of Alum
+
SILK: 5% of WOF of Cream of Tartar

Wool Fibres – Mordanting

Step-by-step references to help you with the pre-dyeing fabric treatment.

STEP 1.

Start by weighing the amount of dry fibres, this will be the WOF.

In this example: the wool yarn total WOF is 37 g.

STEP 2.

Measure 15% of WOF of Alum and 5% WOF of Creme of Tartar.

If you don't have Creme of Tartar it is also fine just to use Alum, this ingredient adjusts the ideal pH for wool and helps protect the fibre during the mordanting process.

Wool Fibres – Mordanting Cont.

Step-by-step references to help you with the pre-dyeing fabric treatment.

STEP 3.

Add both Alum and Creme of Tartar to a pot full of water and bring to simmer, until they are fully dissolved. Wet the wool fibres before adding to the pot. Be aware never to boil protein fibres as they can easily get damaged by excessive heat.

Simmer for 1 hour. Optional: to guarantee maximum mordant absorption you can leave the fibres in the mordant bath overnight.

STEP 4.

Remove the yarns or fabric from the mordant bath and rinse thoroughly in running water. Be careful not to give temperature shocks to animal fibres, if the bath is still warm, use warm water to rinse as well, or let it cool down.

In this example: 5 g of Alum and 2 g of Creme of Tartar were used.

Silk Fibres – Mordanting

Step-by-step references to help you with the pre-dyeing fabric treatment.

STEP 1.

Start by weighing the amount of dry fibres, this will be the WOF.

In this example: the silk fabric WOF is 16 g.

STEP 2.

Measure 15% of WOF of Alum.

In this example: 3 g of Alum was used.

Silk Fibres – Mordanting Cont.

Step-by-step references to help you with the pre-dyeing fabric treatment.

STEP 3.

Add the Alum to a pot full of water and bring to a simmer, until it is fully dissolved. Wet the silk fabric before adding to the pot. Be aware never to boil protein fibres as they can easily get damaged by excessive heat.

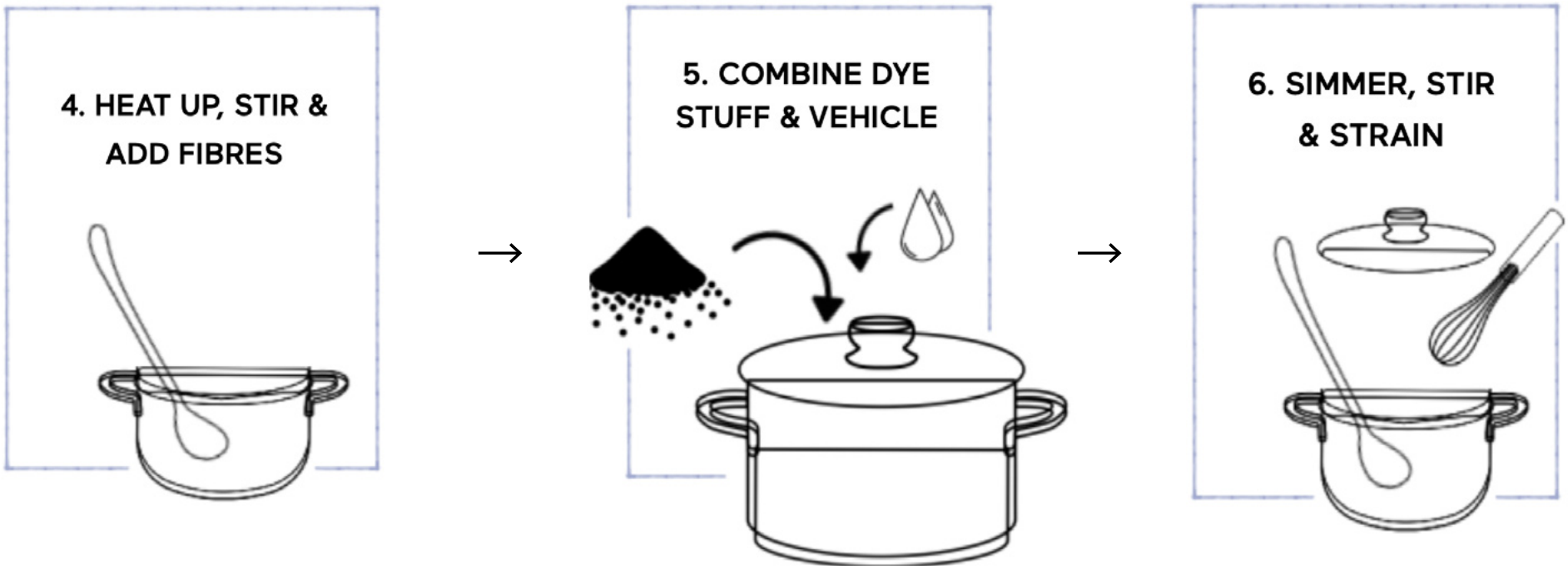
Leave on gentle simmer for 1 hour. Optional: to guarantee maximum mordant absorption you can leave the fibres in the mordant bath overnight.

STEP 4.

Remove the yarns or fabric from the mordant bath and rinse thoroughly in running water. Be careful not to give temperature shocks to animal fibres, if the bath is still warm, use warm water to rinse as well, or let it cool down.

Dye Colour Extraction

Each kind of dyestuff, whether extract powders, fresh berries, or bark chippings, have different preparation methods to extract the dye colour. As a rule of thumb – dye extracts, which is what you have in your kit, can be added to water and simmered until the colour is extracted. The bath is strained to remove solid dye particles and the fibres are added to the pot for extra simmering time. However, some dyes can be extracted without heat, while others are extracted in ethanol and others in non-water solutions. The ratio of dyestuff to WOF also varies and often will determine the shade of the colour, as well as the duration of the dyebath.



Dyebath Preparation – Cutch

Step-by-step references to help you with preparing a dyebath. This example uses cutch.

STEP 1.

To prepare the dyebath, start by measuring the amount of extract you will use. This can vary depending on the shade intended, so there is not a precise amount you should use. For cutch the recommended ratio is 5% - 30% WOF.

Add the extract to a small amount of hot water, mixing it into a paste.

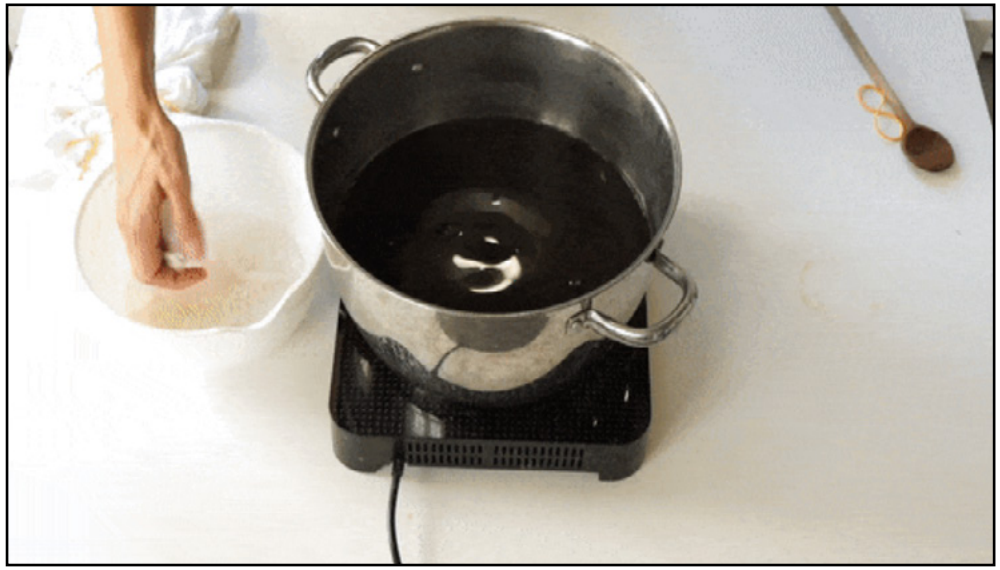
In this example: 10% of WOF of Cutch extract ~20 g.

STEP 2.

Add the paste to a pot full of water and turn the heat on to simmer. This dye doesn't require additional simmering to extract the colour, so you can move to the next step.

Dyebath Preparation – Cutch Cont.

Step-by-step references to help you with preparing a dyebath. This example uses cutch.



STEP 3.

Add all the wet fibres into the dyebath. Now you can mix all different compositions, vegetable and animal (both silk and wool). Leave it on a gentle simmer for about 1 hour and for more intense results, leave the fabrics in the bath overnight.

STEP 4.

Remove the yarns or fabric from the dyebath and rinse thoroughly in running water.

Dyebath Preparation – Cutch, Modifiers

Step-by-step references to help you with modifying a dyebath. This example uses cutch.

IRON MODIFIER.

The quantity of Iron (ferrous sulphate) depends on the final result aimed, it's recommended to mix a small quantity (no more than 2% of WOF) in a pot with warm water and add this solution little by little to a bigger pot with your fibres. The change in colour will be instantly visible.

When the desired tone is reached, rinse immediately to stop the modifying process.

ACID MODIFIER.

We test an acid solution to see its results on the dye colour. In this case we used vinegar, but citric acid and lemon juice can also be used. Similar to the previous process, the quantity of vinegar depends on the final result aimed, it's recommended to mix a small quantity in a pot with warm water and add this solution little by little in a bigger pot with your fibres, the change in colour will be instantly visible if the dye is pH sensitive. In this case cutch is not so pH sensitive so a slight change in colour can be observed.

When the desired tone is reached, rinse immediately to stop the modifying process.

8.
Books, Inspirations & Sources

Books and Inspirations

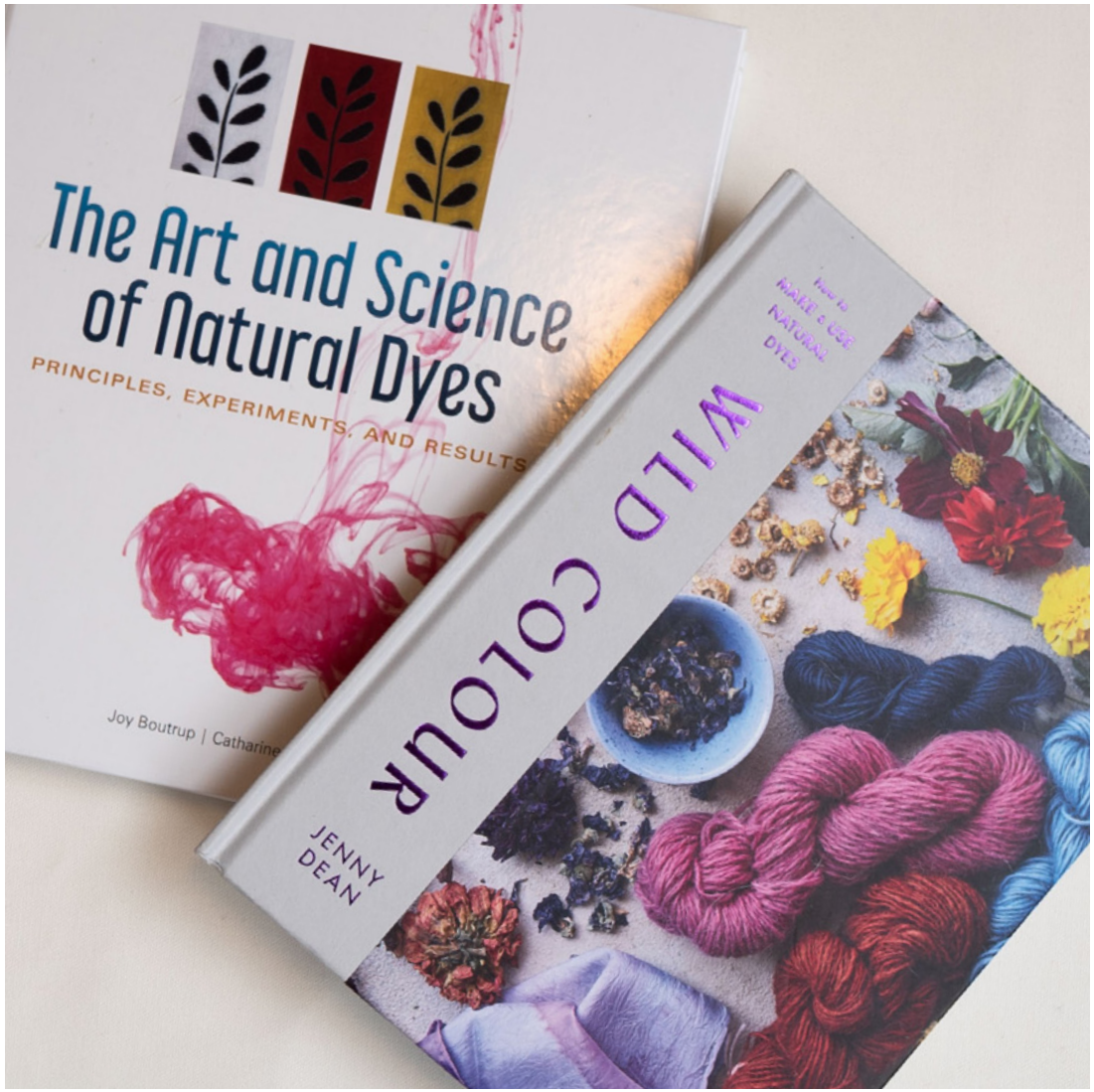
These are some of our references and inspirations that will provide additional information and techniques on natural dyeing.

Books

- Botanical Inks: Plant-to-Print-Dyes, Techniques and Projects by Babs Behan
- The Art and Science of Natural Dyes: Principles, Experiments, and Results by Joy Boutrup, Catharine Ellis
- The Modern Natural Dyer: A Comprehensive Guide to Dyeing Silk, Wool, Linen and Cotton at Home by Kristine Vejar
- Wild Colour by Jenny Dean
- The Wild Dyer: A Maker's Guide to Natural Dyes with Projects to Create and Stitch by Abigail Booth

Inspirations

- @botanicalcolours
- @ellenmaewill
- @foragingcolour
- @mad_provost
- @maiwa_naturaldyes
- @mattricaria
- @plants_and_colour
- @spiritofthreads



Sources

Books

- The Art and Craft of Natural Dyeing: Traditional Recipes for Modern Use by J.N. Liles
- The Art and Science of Natural Dyes: Principles, Experiments, and Results by Joy Boutrup, Catharine Ellis
- Wild Colour by Jenny Dean

Web

- All Natural Dyeing | Everything You Need To Begin Dyeing Yarn, Fibre And Textiles Today
- Asian Rivers Are Turning Black. And Our Colourful Closets Are To Blame | CNN
- Dyeing | Alpenglow Yarn
- Green'ing | Colours And Natural Ingredients
- How to Use Iron Powder | Botanical Colors
- How to Mordant | Botanical Colors
- Iron Mordant Recipe For Natural Dyeing And Eco Printing
- Natural Dye Extract Instructions | Botanical Colors
- Natural Dyes | What They Are And How To Use Them
- Natural Dyes | Wild Colours
- Stony Creek Colours | Cleaner And Safer Bio-Based Colours For Textiles
- The True Cost of Colour: The Impact of Textile Dyes on Water Systems Fashion Revolution
- Turkey Red Journal | A Journal Dedicated To Natural Dyes

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