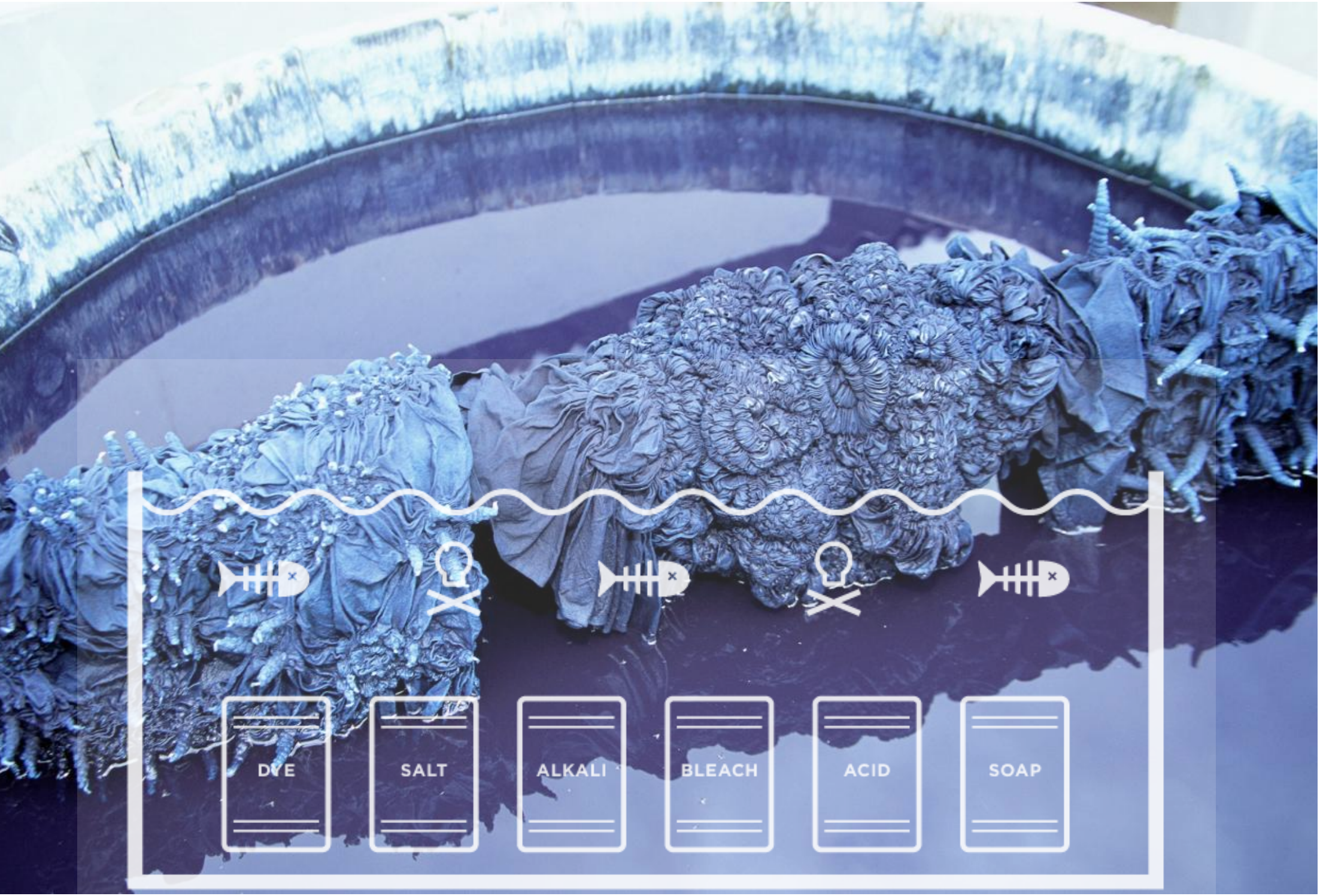
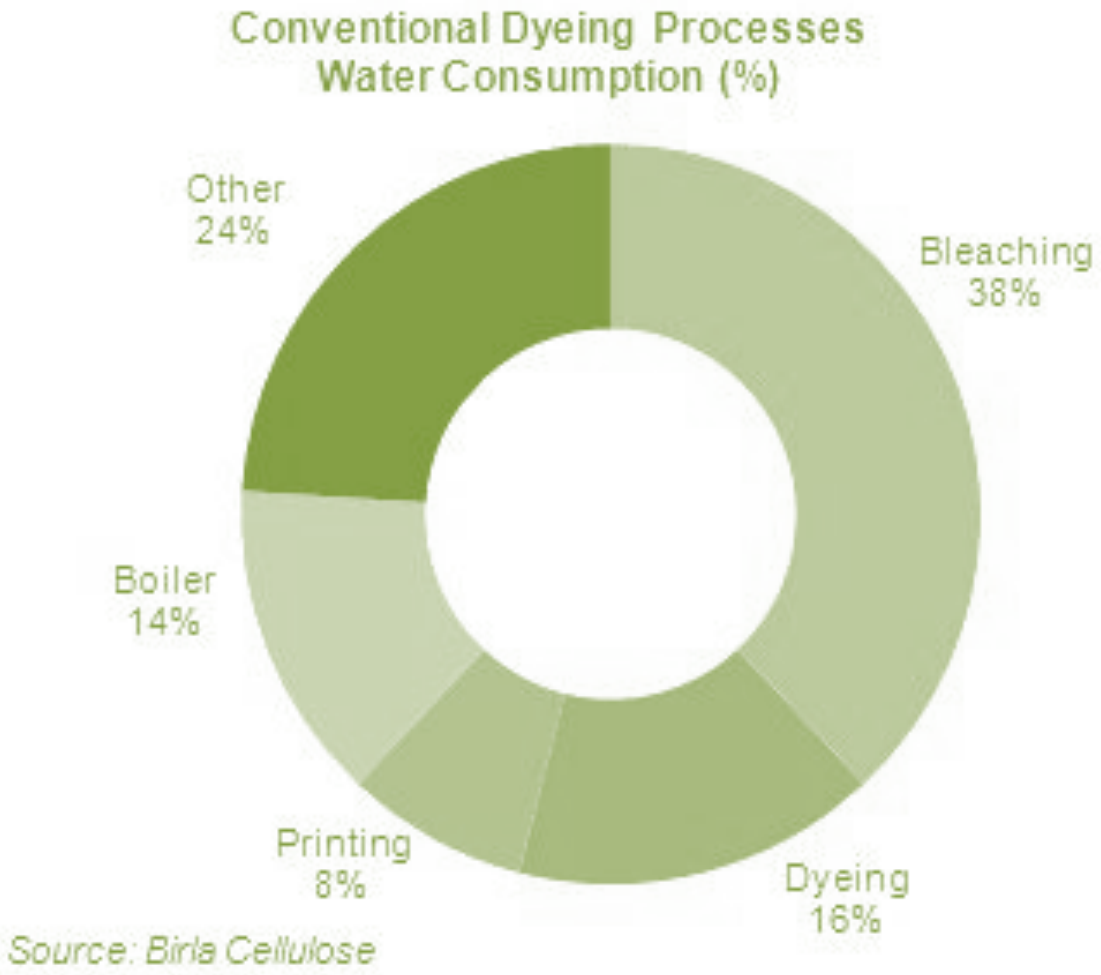
# BIO SHADES

textile dyeing with natural pigments

# Which color are you wearing?


DYE
SALT
ALKALI
BLEACH
ACID
SOAP


Conventional Dyeing Processes
Water Consumption (%)
Other
24%
Bleaching
38%
Boiler
14%
Printing
8%
Dyeing
16%
Source: Birla Cellulose

GREENPEACE

TOGETHER WE CAN BUILD A

# TOXIC-FREE FUTURE

where dangerous chemicals are no longer produced, used and released into our environment

http://www.greenpeace.org/international/en/campaigns/detox/

Alkylphenols

Azo dyes

Brominated and chlorinated flame retardants

Cadmium, lead, mercury and chromium

Chlorinated solvents

Chlorobenzenes

Chlorophenols

Organotin compounds

Perfluorinated chemicals

Phthalates

Short-chain chlorinated paraffins


Could microbes be a valid alternative to chemica dyes?

# faber futures

Natsai Audrey Chieza


Can we create a living
dyeing factory?


Colour mixing

The photobacterium in the dress will glow for 72 hours after application.

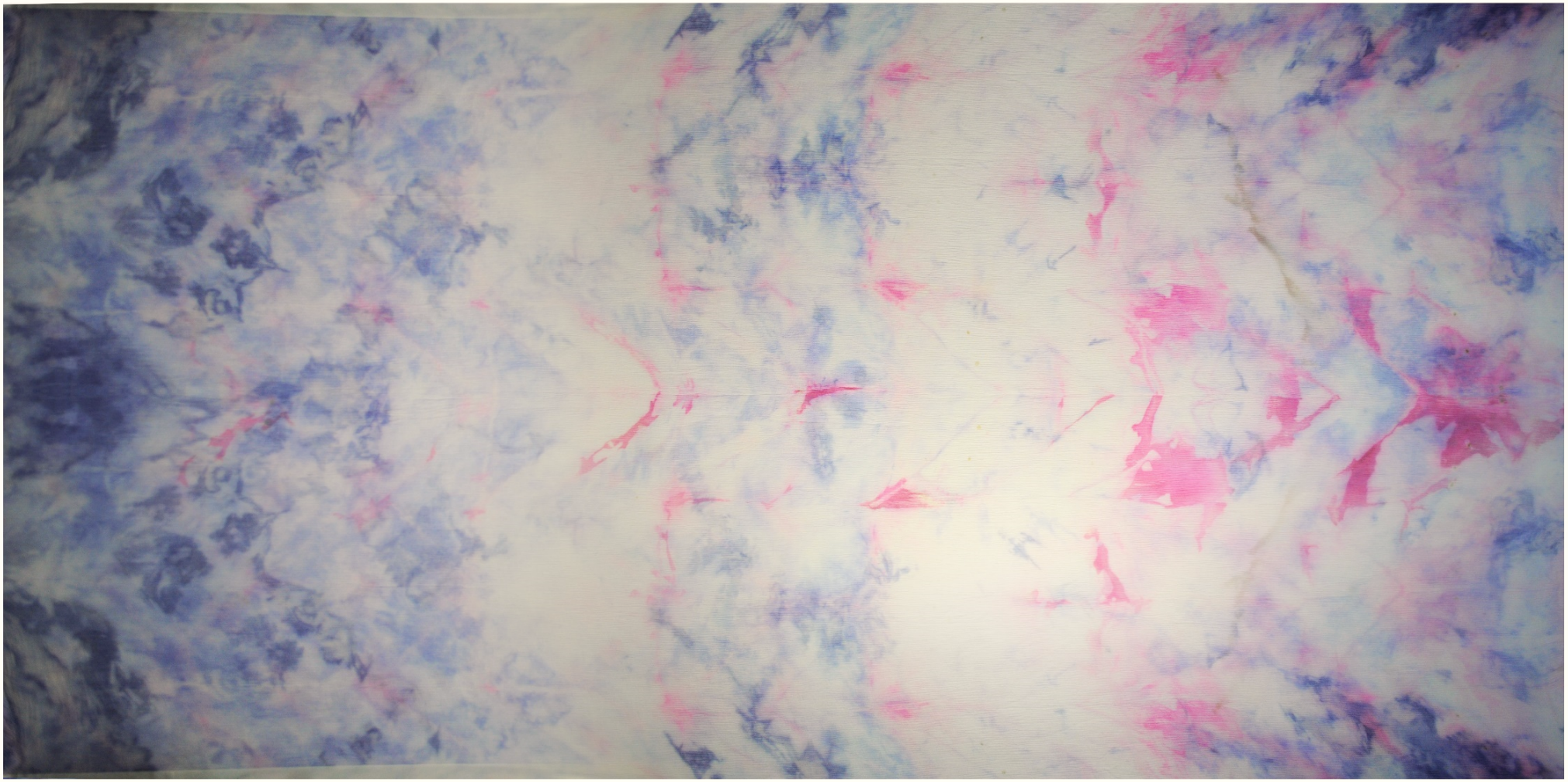
http://www.victoriageaney.com

# What is a bacteria?

A single-celled organism.
These dwell nearly everywhere on Earth, from the bottom of the sea to inside animals.

Janthinobacterium lividum
is an aerobic, gram-negative, soil-dwelling bacterium that has a distinctive dark-violet (almost black) color. This color is due to a compound called violacein, which is produced when glycerol is metabolized as a carbon source. Violacein has anti-bacterial, anti-viral, and anti-fungal properties.

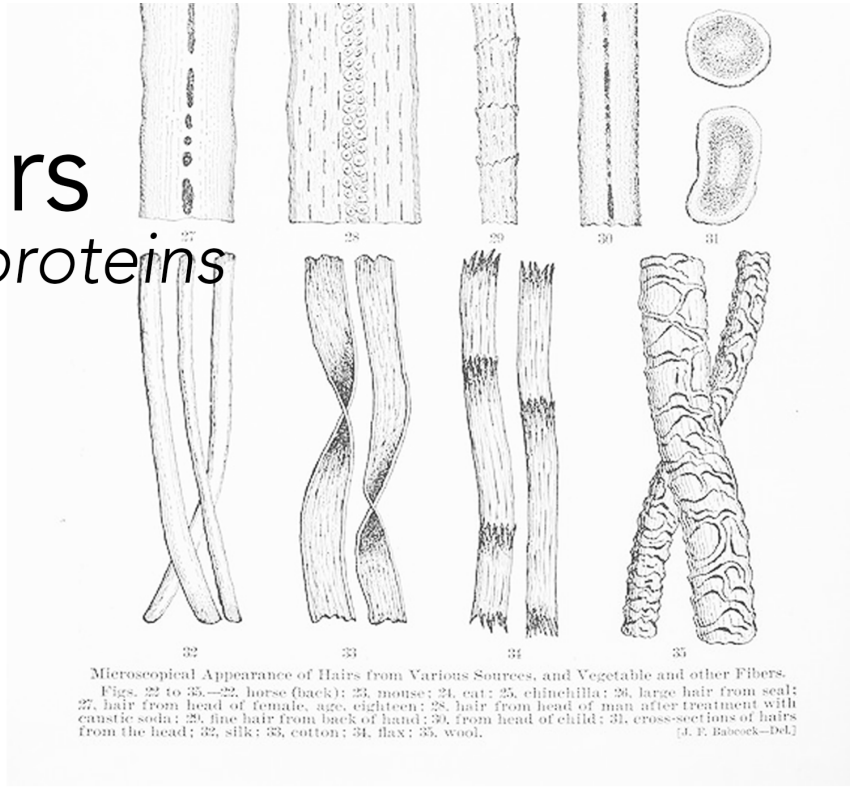
silk soaked in 3 dye baths of NA inoculated with Janthinobaterium lividum and Serrata macrescens (JL, SR)



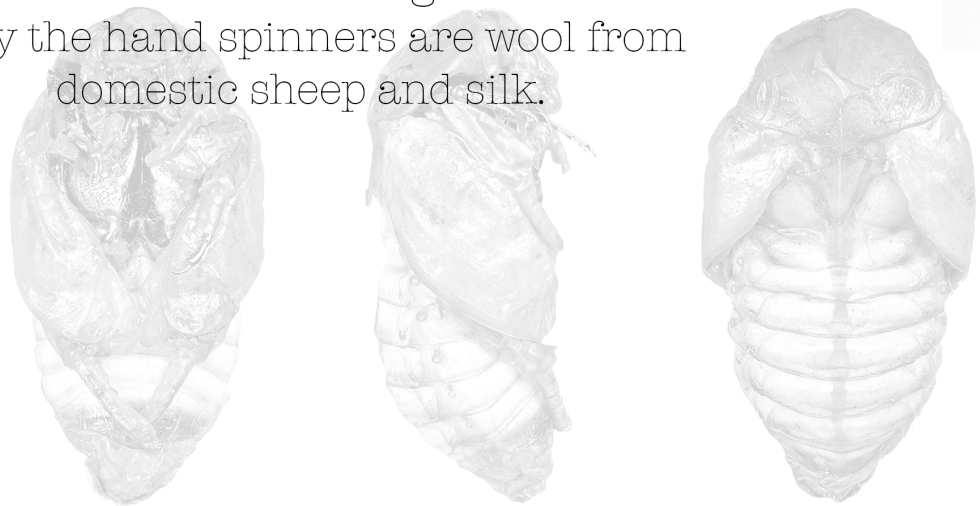

Can we rediscover our heritage to revalue it?

# Animal fibers

*proteins*




Animal fibers are natural fibers that consist largely of particular proteins. Instances are silk, hair and fur (including wool) and feathers.
The animal fibers used most commonly both in the manufacturing world as well as by the hand spinners are wool from domestic sheep and silk.



*Wool*

*Silk*

*Mohair*

*Alpaca*

*Camel*

# Vegetable fibers

*cellulose*

Plant-derived vegetable fibers are classified according to their source in plants as bast, leaf, or seed-hair. The fibers in bast and leaf plants are integral to the plant structure, providing strength and support. The principal chemical component of vegetable fibers is cellulose, with varying amounts of lignin and hemicelluloses also usually present; thus the fibers are also referred to as cellulosic or lignocellulosic.

*Cotton*
*Linen*
*Ramie*
*Hemp*
*Raffia*
*Jute*

# Mordants

A mordant is a substance, typically an inorganic oxide, which is combined with a dye bath to enhance the fastening proces of the dye onto organic fibers. They enhance the light- and wash-fastness of the dye on the fibers, both the protein based and the cellulose based ones. Mordants also have an impact on the final colour.

Alum

Copper liquor

Iron liquor

*mordants*

# *Alum*

Alum can be used to mordant on all kinds of fibers. It helps brightening the colours and assures a good light and wash fastness

## Animal fibers

*for a 100 gr of textile/yarn*

*Enough warm water to cover completely the textiles*
*Use 10-20% of weight of fibers of Alum*
*Add 8% of weight of fibers of tartaric acid (the tartaric acid works better when first dissolved in a little bit of boiling water)*

## Vegetable fibers

*for a 100 gr of textile/yarn*

*Enough warm water to cover completely the textiles*

*Use 10-15% of weight of fibers of Alum*

*mordants*

# Copper

Copper can be used to mordant on all kinds of fibers, it has a greater effect on vegetable fibers than animal ones. It helps darkening and saddening the colors, providing shades which are otherwise very difficult to obtain. While saddening the colors, it brings out greens and blues. It is a good additive for any dyeing bath of those colors, but also for any dyeing bath which aim is to add a subtle blue hue to any other specific color.
Wear rubber gloves when handling the fibers in this bath.

## Animal fibers

*for a 100 gr of textile/yarn*

*Enough warm water to cover completely the textiles*
*Use 3%-6% of weight of fibers (powder)*

*or*

*Use copper liquor*

## Vegetable fibers

*for a 100 gr of textile/yarn*

*Enough warm water to cover completely the textiles*
*Use 3%-6% of weight of fibers (powder)*

*or*

*Use copper liquor*

*mordants*

# *Iron*

Iron can be used to mordant on all kinds of fibers, it's often used as a modifier instead as of a mordant. It helps darkening and saddening the colors, it increases the color wash and light fastness a lot. Wear rubber gloves when handling the fibers in this bath.

## Animal fibers

*for a 100 gr of textile/yarn*

*Enough warm water to cover completely the textiles*
*Use 3%-5% of weight of fibers (powder)*

*or*

*Use iron liquor*

## Vegetable fibers

*for a 100 gr of textile/yarn*

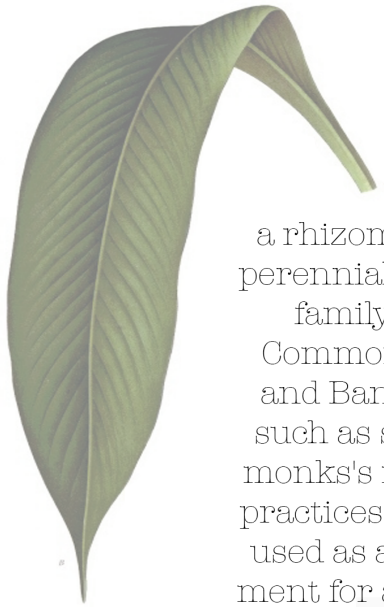
*Enough warm water to cover completely the textiles*
*Use 3%-5% of weight of fibers (powder)*

*or*

*Use iron liquor*

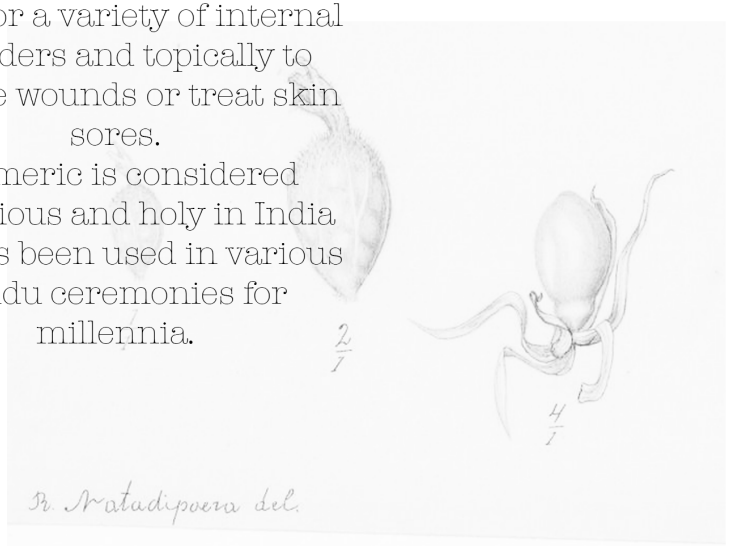
# Turmeric

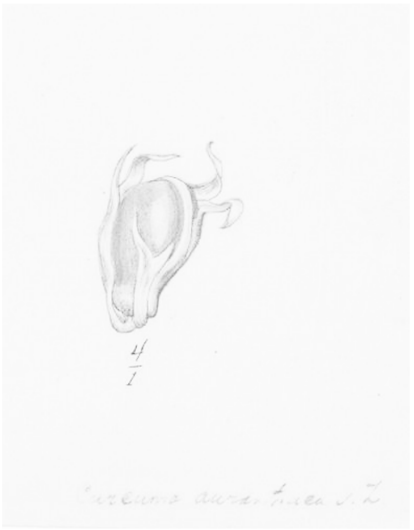
## *Curcuma longa*



a rhizomatous herbaceous perennial plant of the ginger family, Zingiberaceae. Commonly used in Indian and Bangladeshi clothing, such as saris and Buddhist monks's robes. In Ayurvedic practices, turmeric has been used as an attempted treatment for a variety of internal disorders and topically to cleanse wounds or treat skin sores.

Turmeric is considered auspicious and holy in India and has been used in various Hindu ceremonies for millennia.





# Turmeric

# Berberis

# Black Beans


black bins
no boil
black bins
+soda
boiled
black bins
+vinegar
+lime

# Cabbage

# Tea

# Lichens

# Coffea

# Bloodroot

# Onion skins

# Preparation

## Animal fibers

Wash the fibers gently with luke warm water and a little bit of soap.
Keep in mind that to much friction and heat will felt the wool, while it will damage the silk fibers making them dull and brittle.
Also sudden temperature changes are not recommended with animal fibers.

## Vegetable fibers

Boil the fibers for an hour in water and sodium carbonate (soda ash)
±2 spoons for 4 liter water.
This process will remove the oil and waxes that are naturally presentin the fibers.
It's good to repeat this process twice or to start by washing the fibers at a high temperature in the washing machine.

# Modifiers

These are substances applied after the dye bath to extend the number of shades possible with one dye bath.

The same modifier in combination with different mordants will produce different colours as well.

With some dyes the colour change is drammatic, with other is subtle and soft.

Some modifiers change the Ph of the water, other act as a stronger mordant while imporving the .

Usually they can be divided into 4 typologies of modifiers:

- Acidic modifiers
- Alkaline modifiers
- Copper modifiers
- Iron modifiers

# Modifiers

## Acidic modifiers:

Simmer in vinegar for 5 – 10 min

-Tends to make the shades lighter or yellower in tone

-From red to orange
-From purple to pink
-From rust to yellow
-From blue to purple

## Alkaline modifiers:

Pour hot water on the crystals until they dissolve

-Tends to make the shades pinker in tone or change it dramatrically

-From purple to blue or green
-From yellow to orange or red
-From brown/red to red/pink

## Copper modifiers:

Simmer in the copper liquorfor 10 - 20 min

-Tends to make the shades greener in tone

-From yellow to green
-From red to purple/ blue
-From ocher to brown

## Iron modifiers:

Simmer in the iron liquor for 5 min

-Tends to make the shades darker in tone

-From yellow to olive green/brown
-From orange/red to brown
-From purple to dark purble/dark grey

# 25 colours in one dye bath

Prepare 4 groups of 5 skins for each type of fiber, mordant them according to the scheme below:

- Group A – unmordanted fibers
- Group B – Alum mordanted fibers
- Group C – Copper mordanted fibers
- Group D – Iron mordanted fibers

Rinse and dye all skins in the same dye bath, accordingly to the recipe.

Rinse the skins again, be careful with sudden changes of temperature, these can affect the fibers.

Take one skin from each group and tag them accordingly (A1, B1, C1, D1)

Take one skin from each group, tag them accordingly (A2, B2, C2, D2) and then place them in a bath of acidic modifier and follow the instructions.

Take one skin from each group, tag them accordingly (A3, B3, C3, D3) and the place them in a bath of alkaline modifier and follow the instructions.

Take one skin from each group, tag them accordingly (A4, B4, C4, D4) and the place them in a bath of copper modifier and follow the instructions.

Take one skin from each group, tag them accordingly (A5, B5, C5, D5) and the place them in a bath of iron modifier and follow the instructions.

# Turmeric

Dyeing procedure:

- Use ½ of the WOF

To use turmeric powder mix it to a paste with a little warm water, stirring well to incorporate all the particles. Add more water continuing to stir well before pouring it into the dye bath. This dye solution can be applied to all fibers, with or without heat.

If you are dyeing skeins of yarn, it can be difficult to rinse turmeric powder particles out of the fibers. To avoid this problem, simmer the dye solution for one hour and then strain it through a coffee filter before adding the fibers. Rinse the fibers well after dyeing but teen always use a pH-neutral washing solution to prevent an unwanted color change.

# Madder

Dyeing procedure:

- Use ½ of the WOF

To process the fresh or dried plant tops for dyeing, cut them up into small pieces and simmer gently for about one hour. Let the solution cool, then add the fibers and either leave them to steep or apply gentle heat until you achieve a suitable depth of colour.

Madder root can also be simmered gently to extract the dye color but once the fibers have been added, the temperature should be kept well below a simmer to achieve clear reds. Simmering or boiling the dye bath will turn red colors browner and duller.

The best color results are often achieved if the pieces of madder root are left in the dye pot during the dyeing process.

When planning a madder dyeing session,have plenty of fibers ready to be dyed, and aim for a range of red to orange shades from one dye bath.

Then, take the largest dye pot, put in the chopped madder root, and fill up the pot with warm water. Add the first batch of fibers to be dyed and leave them in for at least a day or two. But keep checking the color and when it seems deep enough, remove half of the fibers and leave the rest to soak for another day for deeper shades.

When the bath seems to hold no more color, add vinegar or acid to modify the color into bright oranges and yellows.

# Hibiscus

Dyeing procedure:

- Use ¼ of the WOF

To extract the dye color: pour boiling water over the flowers, then simmer them for half an hour. Strain off the dye liquid or leave the flowers in the dye bath.

Simmer the fibers in the dye liquid for about 45 minutes then leave them to soak in the dye bath at least overnight and longer for really deep shades.

# Onion

Dyeing procedure:

- Use ¼ of the WOF

Onion skins can be added to dye baths prepared from tree bark to make the dye yellower and brighter or introduced to madder dye baths to produce colors that are more orange in tone.

Used on their own with an alum mordant, onion skins give orange, rust, and brown shades, depending on the quantity used.

The skins from red onions can also be used, although they do not always produce the same colors as white onions. Materials dyed with onion skins produce green shades when overdyed in an indigo vat.

Onion skins can also be used to supplement a yellow dye bath made from other plant material, the addition of the onion skins brightens the final result.

# Campeche

Dyeing procedure:

- Use ½ of the WOF

To make a dye bath from logwood chips, first pour boiling water over the chips and leave them to soak for at least 4 hours.

Then add enough water to make the dye bath and simmer the wood chips for 15 to 20 minutes.

Strain off the dye liquid and use this for the first dye bath. Add the fibers, simmer them for 45 minutes, then leave them to cool in the dye bath.

Then remove the fibers, squeeze out any excess dye, and rinse well several times.

Take particular care with this rinsing process, as logwood dye tends to "bleed" out if the fibers have not been thoroughly rinsed.

The logwood chips can be simmered again for 45 minutes to 1 hour to extract more color.

The dye liquid can then be strained off and used to make a second dye bath for a further batch of fibers.

Lovely purple shades result with an alum mordant, but they tend to fade to gray fairly rapidly copper or iron mordants will increase colorfastness on all fibers. Iron mordant or modifier gives dark purples and black, while copper gives bluer hues.

# Alkanet

Dyeing procedure:

- Use ½ of the WOF

Simmer the dyestuff in water for at least one hour to extract the color. It releases a strong, rather unpleasant odor and is best processed outdoors. If this is not possible, ensure the work area is adequately ventilated.

The extracted dye liquid is a pale greenish brown color and looks unpromising, but this is deceptive. Strain off the dye liquid, add the fibers, and simmer for at least one hour for strong colors.

Alkanet is sensitive to both the pH value and the mineral content of the water used for dyeing. For this reason, color results vary from area to area. Sometimes, dyer's alkanet yields greedy tones, sometimes purple tones, and at other times colors are browner but all tend to fall within the gray range when no mordant is used. If applied on an alum mordant, lavender and purple colors can be achieved.

Using modifiers does not cause significant color changes, but subtle and attractive variations in shade.

# Annatto

Dyeing procedure:

- Use ½ of the WOF

To extract the dye, gently simmer the annatto seeds in water for about one hour The seeds can either be removed from the dye bath or left in the dye bath during the dyeing process.

Stronger colors will result if the seeds are left in the dye bath when the fibers are added.

Simmer the fibers in the dye bath for one hour, then leave the fibers to cool overnight in the dye liquid. Annatto can also be successfully applied without heat.

To get the maximum color from the seeds, add one or two teaspoons of washing soda to the water in which the seeds are simmered to extract the dye.Then strain off the dye liquid and allow it to cool before adding the fibers.

Soak the fibers in the cool solution until the depth of color required is achieved.

# Black Beans

Dyeing procedure:

- Use 1 to 2 times the amount of the WOF

This is a cold dye, no heat should be applied at all to this dye bath.

Soak the beans in water, take care, the beans will expand by soaking up the water. Also the amount of water will determine the depth of colour of the dye.

Stir the beans a couple of times a day for 24 hours.

# Red Cabbage

Dyeing procedure:

- Use 2 times the amount of the WOF

To process the fresh cabbage for dyeing, cut it up into small pieces. Place them in water and boil them for about an hour.

Let the solution cool, then strain the pieces out of the dye bath.

At this point add the fibers and either leave them to steep or apply gentle heat until you achieve a suitable depth of colour.

# Avocado

Dyeing procedure:

- Use 1 to 2 times the amount of the WOF

To process the fresh or frozen pits and skins of avocado for dyeing, cut them up into small pieces. Place them in water and add 50 ml of ammonia for each liter of water.

Simmer, staying well below boiling poin, for about one hour. Let the solution cool, then strain the pieces out of the dye bath.

At this point add the fibers and either leave them to steep or apply gentle heat until you achieve a suitable depth of colour.

Be aware that over heating or even worse boiling the dye bath will turn the dye brown and dull in colour.

The more pits you have, the pinker the dye will result.

You can also first extract some of the dye by leaving the pits and skins in water and ammonia for a couple of days. Then pass onto the process described above.