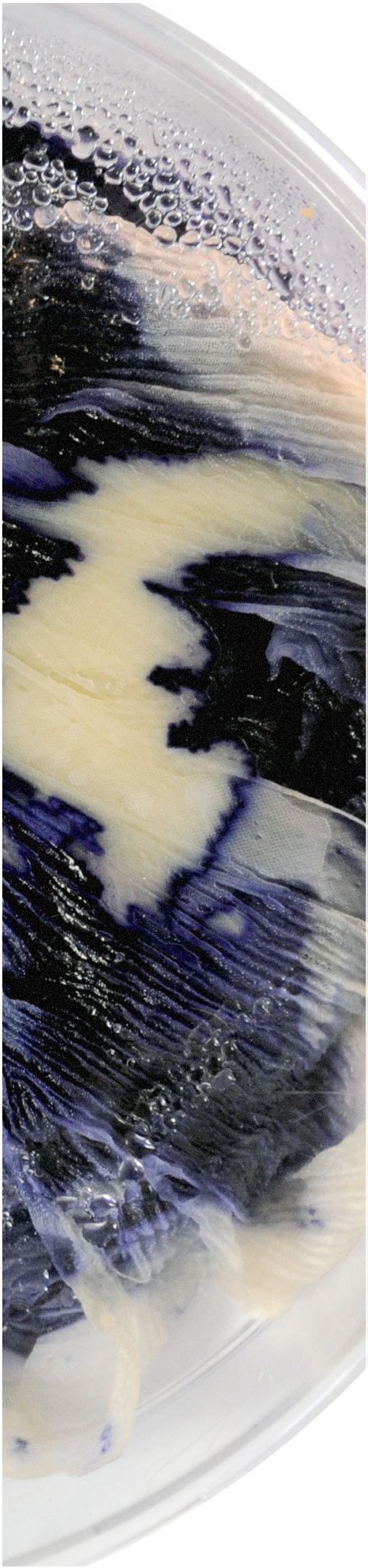

T C B L

TCBL BioShades workshop

15 March 2018

Could bacteria dyeing be a valid alternative to chemical dyes?

By TextileLab Amsterdam - Waag Society

PARTICIPANT WORKBOOK

TCBL BioShades workshop

Could bacteria dyeing be a valid alternative to chemical dyes?

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Introduction

The textile industry is one of the worst offenders when it comes to global pollution. One of the most environmentally disastrous processes within in the industry is dyeing the fibres and textiles that become our clothes. To satisfy the colour demands of designers, industry and consumers, dangerous chemicals are released each day into the fragile environment around us. In the fast-paced fashion, clothing and textile industry, the list of chemical treatments is always expanding; and very few alternative dyeing options are being explored. With TCBL BioShades, we're aiming to investigate dyeing with bacteria as a less harmful alternative and to document and share our knowledge in the process.

During this workshop you'll learn about the potential of bacteria dyeing and how to dye textiles yourself. You'll also get to know the members of other labs, experts from different fields, and workshop participants. Remember that this workshop is as much about bringing people together as it is about learning a new skill because we can only make a difference together!

About Textile Clothing Business Labs

TCBL aims to renew the European Textile & Clothing sector. We are exploring new ways to design, make, and work together and inventing new business models to open up new markets. BioShades is one of the research topics.

Safety warning

The bacteria you'll be using in this workshop are not known to be dangerous. Nevertheless you will be working with living organisms, so be careful. If something else starts growing in the petri dish, destroy the petri dish without opening it.

Remember to:

- tie back your hair
- wear a lab coat or similar protection
- wear gloves and don't touch the bacteria with bare hands
- don't touch your face while working with the bacteria
- wash your hands thoroughly afterwards

List of ingredients & materials

Consumables

Bacteria (Janthinobacterium Lividum)

Nutrient broth

Nutrient Agar

Glycerine (max needed is a couple of drops)

Water (if your tap water contains a lot of chemicals, use distilled water)

Ethanol

Autoclave bag

Pipette

Petri dishes

Disposable gloves

Any type of natural fabric ready to dye

Kitchen paper

Tools

Inoculation loop

500 ml glass bottle or jar with cap that fits into the pressure cooker

Tweezers - metal

Thin permanent marker

Gas Burner + lighter (to create a sterile working area)

Oven mitt

Appliances

Small incubator

Pressure cooker

Electric cooker or stove

Step by step instructions

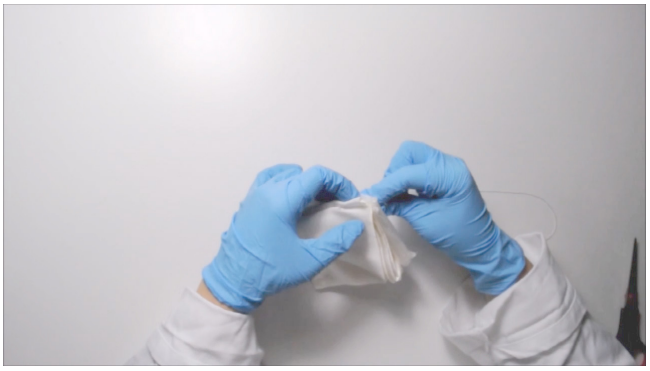
Step 1

Start by preparing the fabric. Using an iron, fold the fabric according to the desired pattern.
If you want to create free-form patterns, use small rubber bands instead (similar to the Japanese shibori dyeing technique).

Step 2

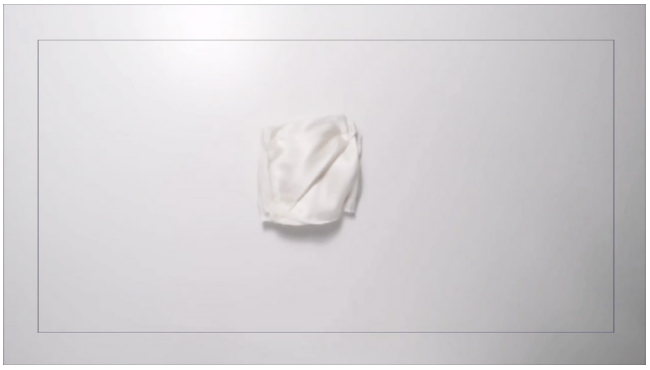
Try to fold the textile piece so that it fits easily in the petri dish and try to minimise its volume as much as possible.

Step 3



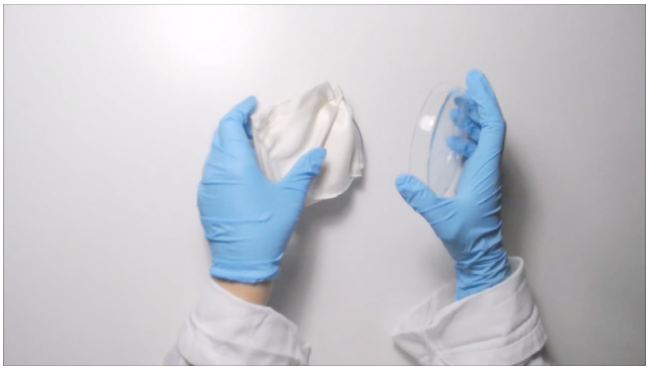
Stitch your fabric to further reduce its volume and to fix its shape. Skip this step if you used rubber bands to create the shibori effect.

Step 4



Make sure that your folded piece can fit in the petri dish once you've completed the stitching.

Step 5



Place the fabric in a petri dish to sterilise it using the autoclave.

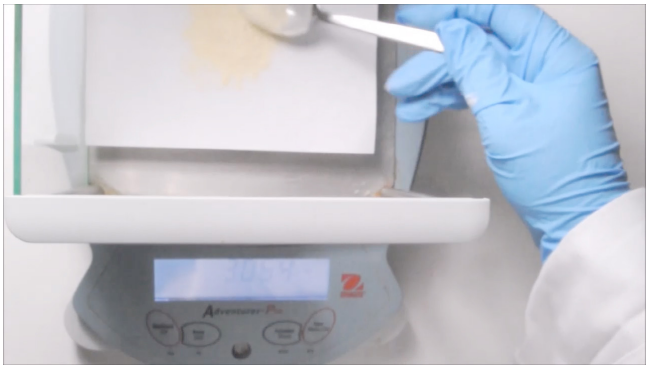
Step 6

The petri dish is now ready to be autoclaved before inoculating it with bacteria.

STEP 7

Collect all the ingredients you need to prepare the cultivation medium for your bacteria. You will need (distilled) water, a glass bottle and a spoon.

STEP 8

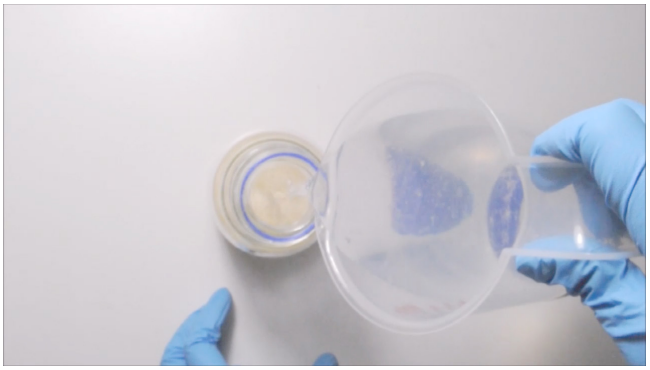


Measure the amount of your medium using a scale. Precision of 0,1 gr is desirable.

STEP 9

Place the medium in a glass bottle and add the appropriate amount of water for the solution.

STEP 10

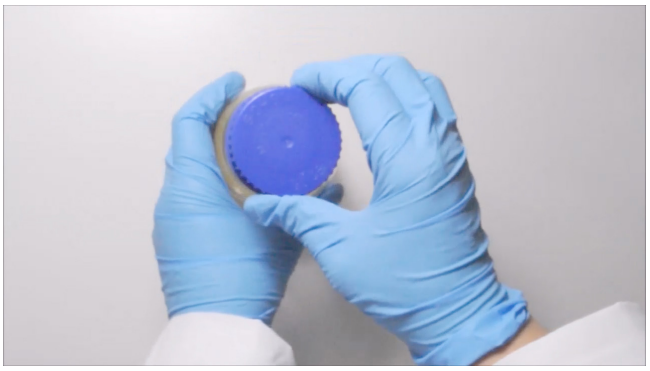


Make sure that the amount that you prepare is up to half of the volume of your glass container, so that the medium does not boil over while being sterilised. (e.g. for 250ml of medium use a 500 ml bottle and nit smaller). Add 1-2% glycerine at this stage if you're working with Janthinobacterium Lividum.

STEP 11

Mix the medium by gently shaking the bottle.

STEP 12



Loosen the cap of the glass bottle so that the air can escape while autoclaving.

STEP 13

Place the petri dish containing the fabric in a plastic autoclave bag. Then place the bottle and petri dish into the pressure cooker. Make sure no water can get inside the plastic autoclave bag.

STEP 14

Seal the pressure cooker by pulling the blue button of the handle towards you and align the blue bar of the lid with the handle (middle position). Cook at maximum power until the red valve pops up and then lower it to minimum and continue cooking for 15 minutes. Switch off the power and wait for it to cool down.

STEP 15

When the red valve drops, you can open the lid. Let the fabric and the medium cool to room temperature before you continue with the process.

STEP 16

Sterilise your workspace by using ethanol (70%). At your workspace, gather together a gas burner, a lighter, the bacteria, an inoculation loop, the fabric and the medium.

STEP 17

Fire up the gas burner and let the flame burn while you work. In this way, you'll create a sterile environment around your workspace, so that you keep everything as clean as possible.

STEP 18

Pass the edge of the bottle quickly back and forth through the flame and pour the medium into the petri dish, opening it as little as possible, towards the side of the glass burner.

Step 19

Wet the folded fabric piece in the petri dish by gently dropping the medium on to it. Repeat the last two steps until your fabric is completely soaked in the medium.

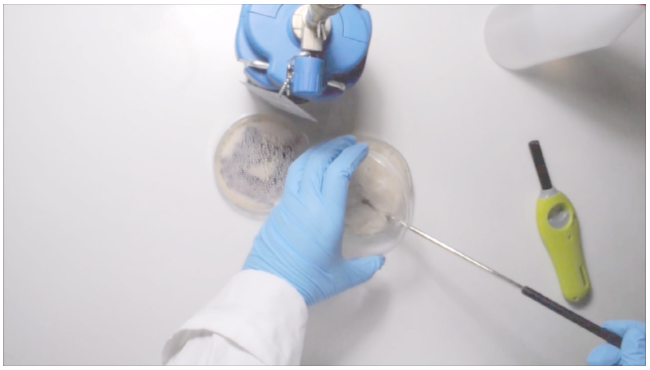
Step 20

Place the inoculation loop tip into the flame and burn it until it becomes red. Hold it close to the fire for a few seconds to keep it sterile.

Step 21

Dip the loop gently onto an unoccupied area of the plate to cool it down. You'll hear the sound of the loop cooling off if you have burnt it long enough. Then touch the culture to inoculate in a new petri dish.

Step 22

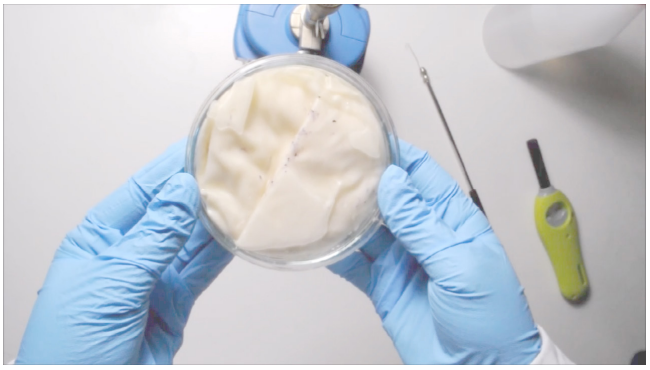


Open the lid of the petri dish with the fabric as little as possible and quickly drag the loop in a zigzag over a section of the fabric soaked in the cultivation medium. Drag it with a single stroke over the surface of the fabric.

STEP 23

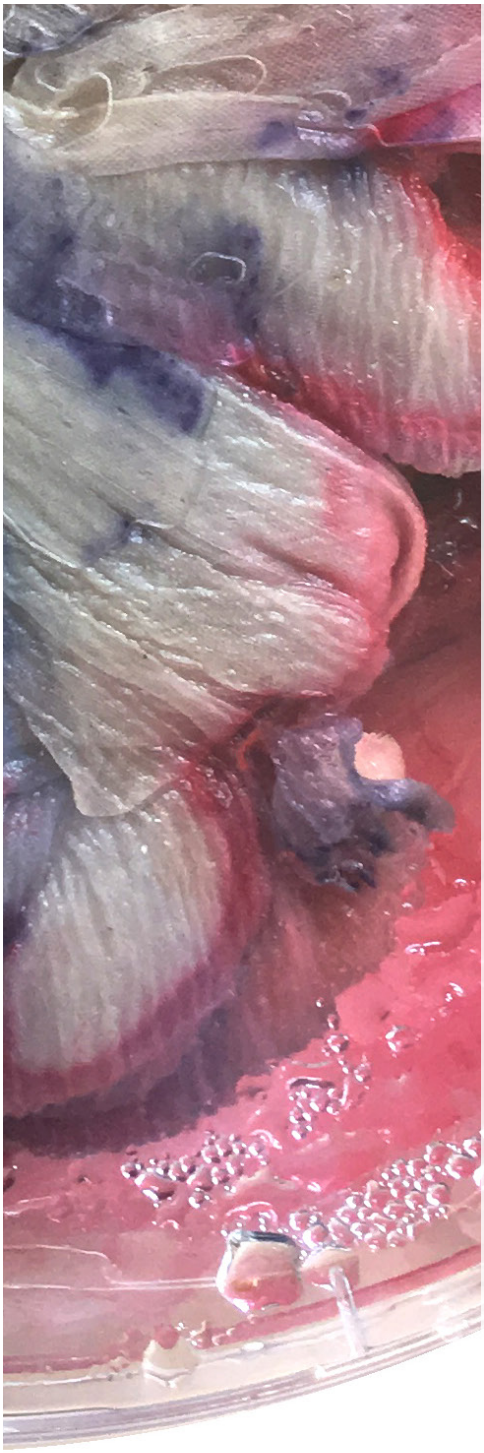
Repeat these two steps 3 to 4 times, rotating your petri dish every time so that you inoculate almost the entire surface of the fabric. Remember to keep it disinfected by burning the loop every time you use it.

STEP 24



Write all the information on the petri dish (medium, bacteria name, date and person) and incubate your textile piece at the optimum temperature and in a stable environment.

Workshop notes:



More information:

tcbl.eu

labs.tcbl.eu

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