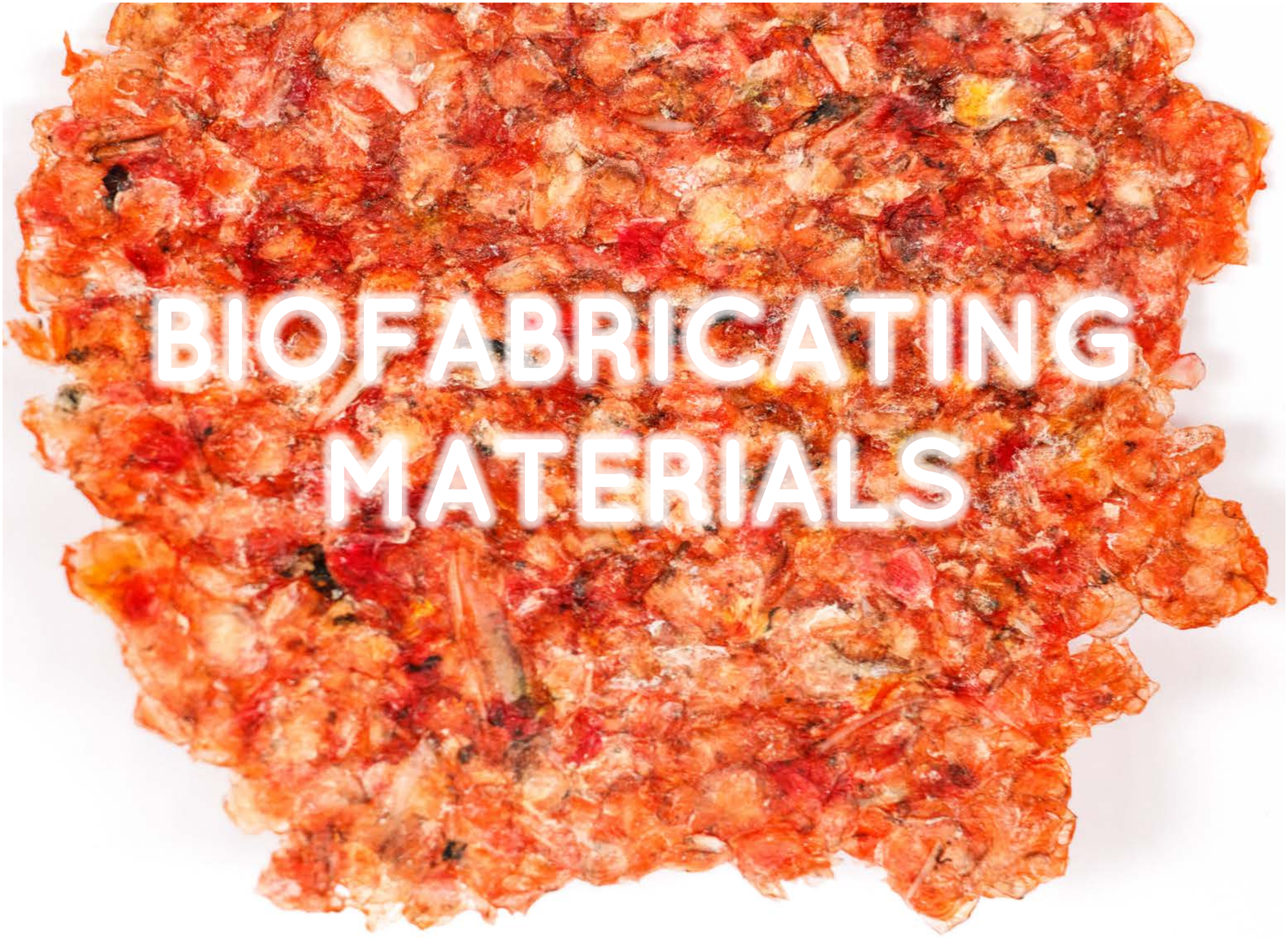

BIOFABRICATING
MATERIALS

materials

CRAFTED materials

- Bioplastics
- Fish leather
- Fruit leather
- Sprayed fibers
- Bombix
- Coconut mat

GROWN materials

- Kombucha
- Mushroom leather
- Tempeh leather
- In Vitro leather
- Engineerd spider silk


BIOPLASTICS

HOW TO

- Warm up the water (as it is or already dyed)
- Add the gelatine
- Add the glycerine
- Mix until smooth
- Simmer for 5 minutes (do not make it boil! This will make it brittle and fragile)
- Pour on your choosen surface
- Let it dry in a dry room, turning your piece until its dry will help you preventing mould formation

TOOLS & INGREDIENTS

1 Gelatine

1 Glycerine

1 Water

1 Cooking pot, spoon and stove

* Food colorants or natural dyes extracts
• Meshes, textiles, nets
• Paint, powders etc

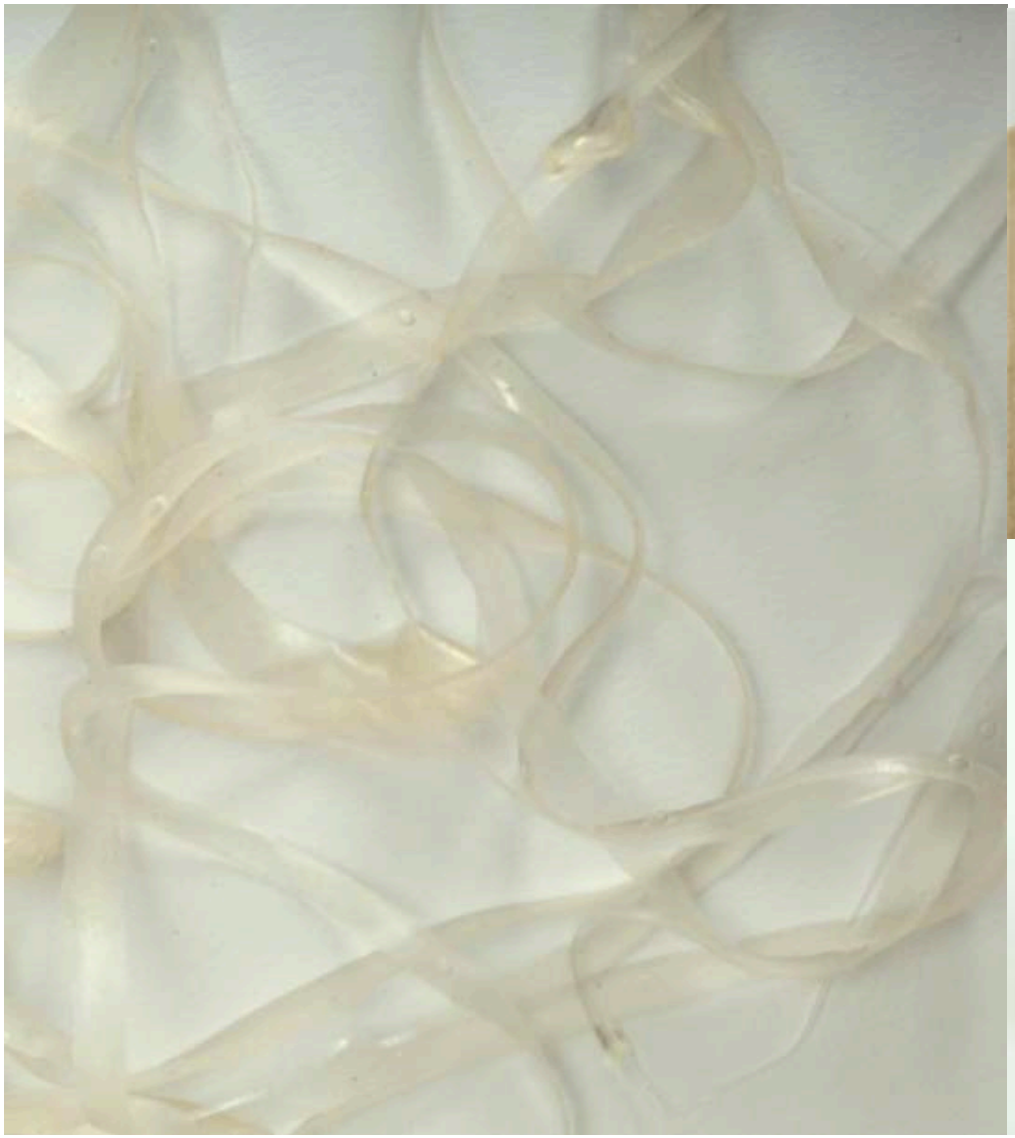
TIPS & TRICKS

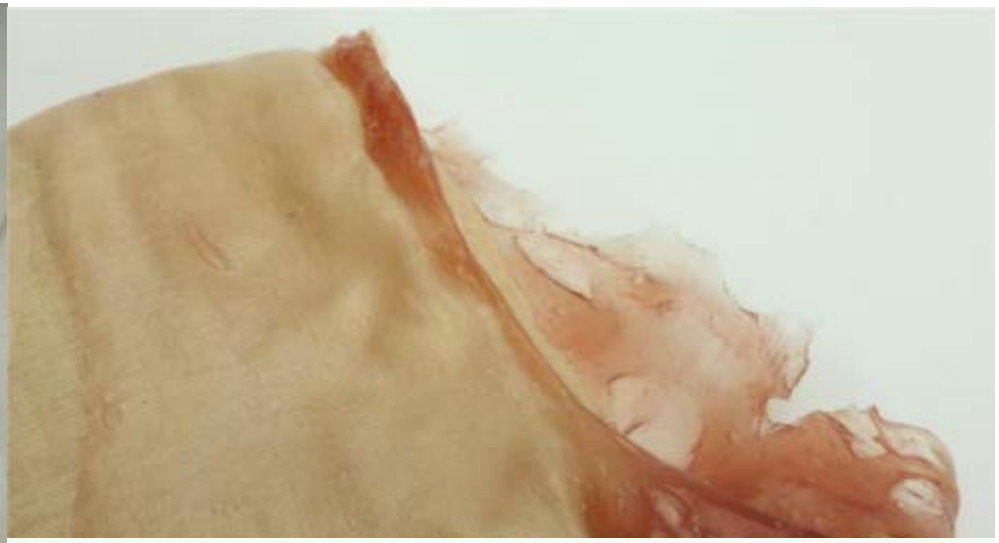
You can add colour by using paint, natural dyes, food colorants, powder pigments etc.

You can add texture by adding natural powders, leafs, flowers, seeds etc

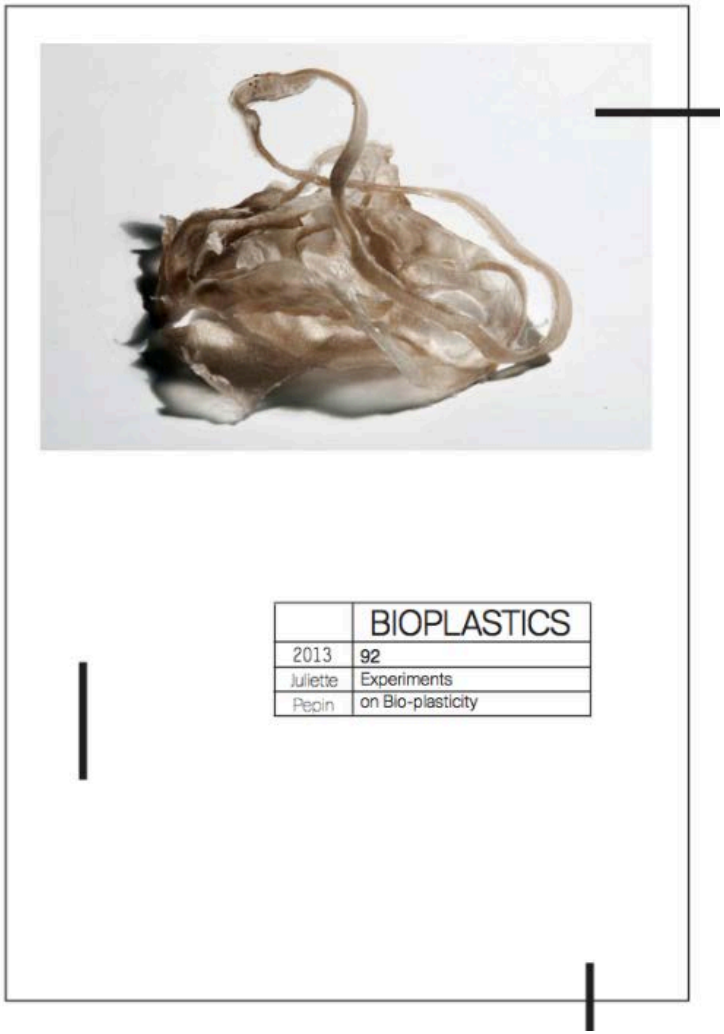
Drying the material on a smooth surface will give you a shiny finish.
While drying it on a textured surface will give you mat, rustic, finishes.

Bioplastics – Miriam Ribul
https://issuu.com/miriamribul/docs/miriam_ribul_recipes_for_material_a

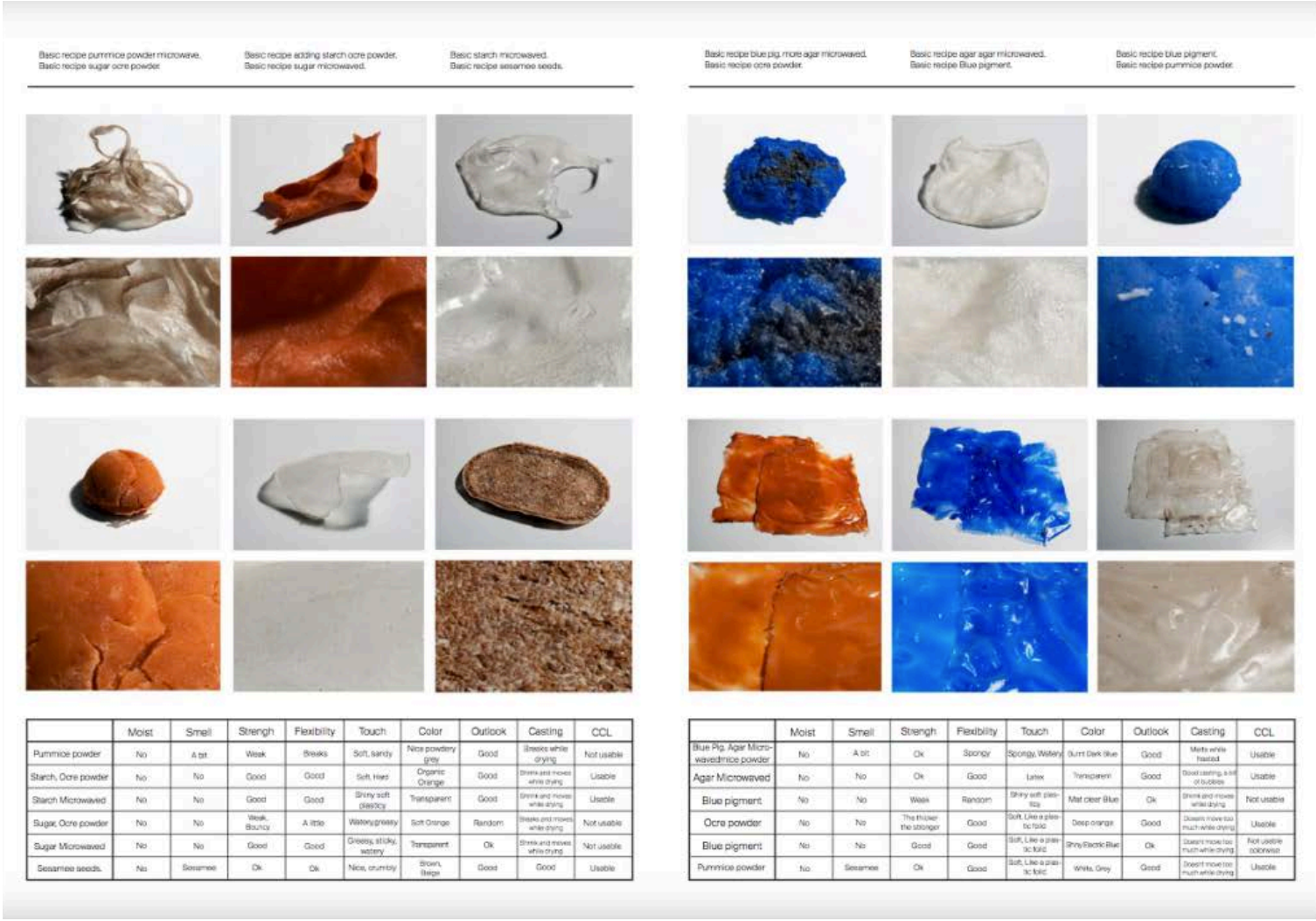




Bioplastics – Miriam Ribul



Bioplastics – Juliette Pepin
https://issuu.com/juliettepepin/docs/bookletbioplastic

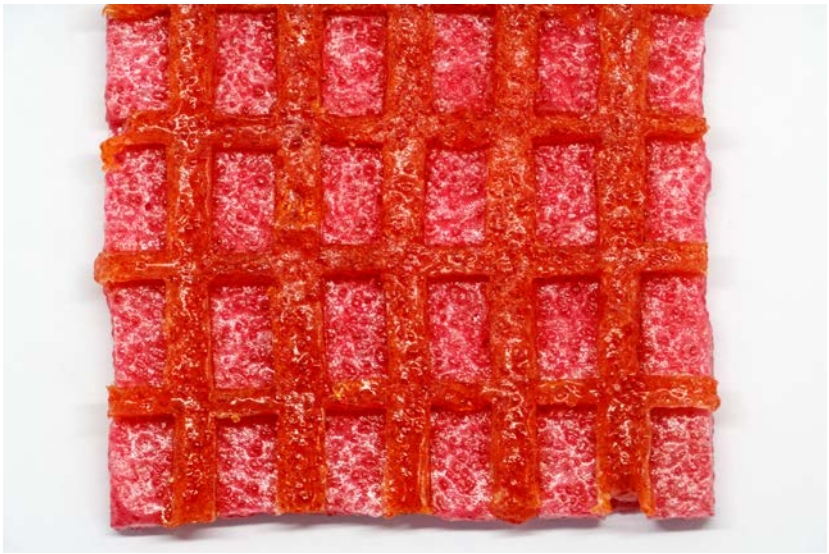


	Moist	Smell	Strengh	Flexibility	Touch	Color	Outlook	Casting	CCL
Pummice powder	No	A bit	Weak	Breaks	Soft, sandy	Nice powdery grey	Good	Breaks while drying	Not usable
Starch, Ocre powder	No	No	Good	Good	Soft, Hairs	Organic Orange	Good	Shrink and moves while drying	Usable
Starch Microwaved	No	No	Good	Good	Shiny soft plastcy	Transparent	Good	Shrink and moves while drying	Usable
Sugar, Ocre powder	No	No	Weak, Bouncy	A little	Watery,greasy	Soft Orange	Random	Breaks and moves while drying	Not usable
Sugar Microwaved	No	No	Good	Good	Greasy, sticky, watery	Transparent	Ok	Shrink and moves while drying	Not usable
Sesamee seeds.	No	Sesamee	Ok	Ok	Nice, crumbly	Brown, Beige	Good	Good	Usable

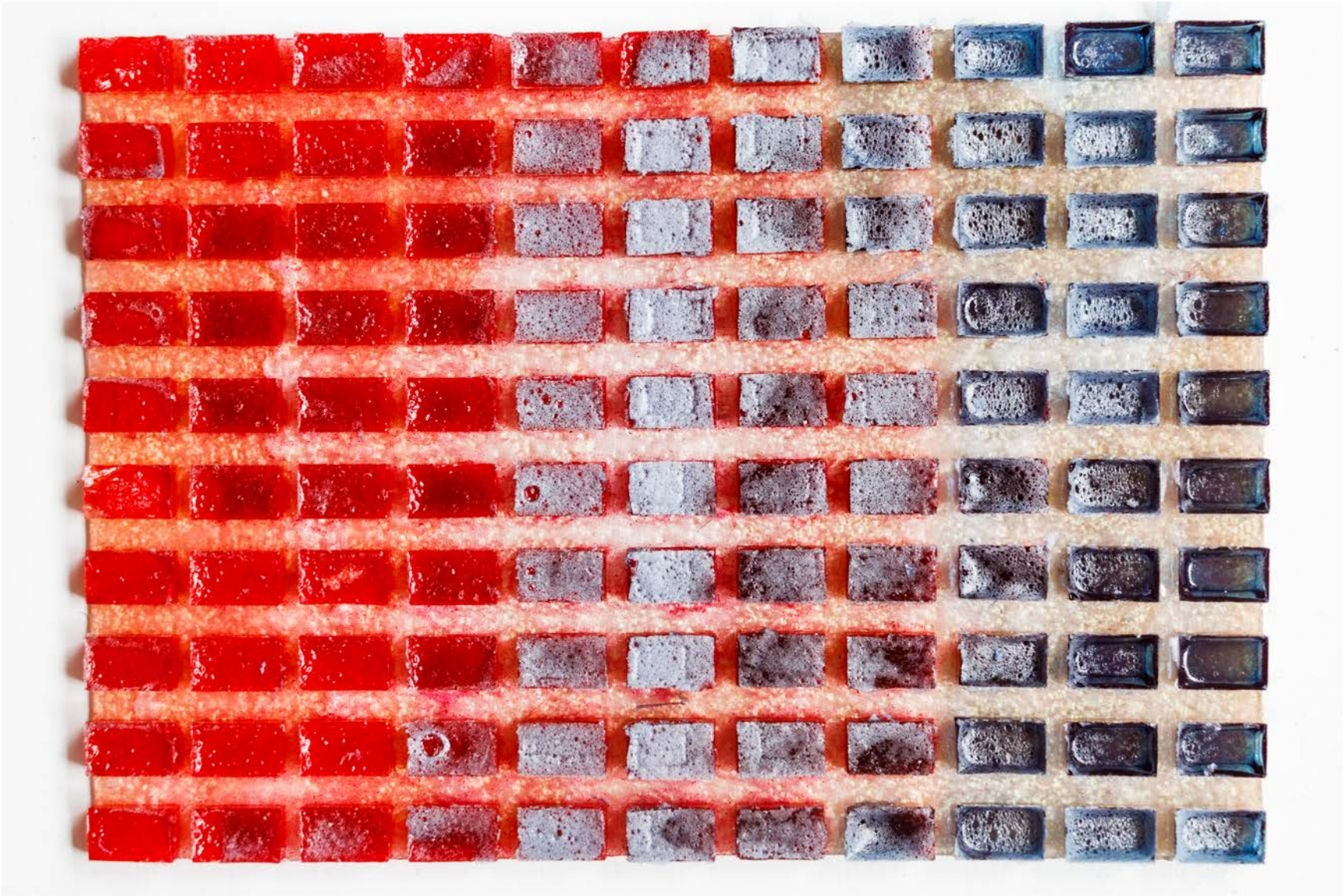
	Moist	Smell	Strengh	Flexibility	Touch	Color	Outlook	Casting	CCL
Blue Pig, Agar Micro-wavedmice powder	No	A bit	Ok	Spongy	Spongy, Watery	Burnt Dark Blue	Good	Melts while heated	Usable
Agar Microwaved	No	No	Ok	Good	Latex	Transparent	Good	Good casting, a bit of bubbles	Usable
Blue pigment	No	No	Weak	Random	Shiny soft plas-tics	Mat clear Blue	Ok	Shrink and moves while drying	Not usable
Ocre powder	No	No	The thicker the stronger	Good	Soft, Like a plas-tic fold	Deep orange	Good	Doesnt move too much while drying	Usable
Blue pigment	No	No	Good	Good	Soft, Like a plas-tic fold	Shiny Electric Blue	Ok	Doesnt move too much while drying	Not usable colorwise
Pummice powder	No	Sesamee	Ok	Good	Soft, Like a plas-tic fold	White, Grey	Good	Doesnt move too much while drying	Usable

Bioplastics – Juliette Pepin
https://issuu.com/juliettepepin/docs/bookletbioplastic

Bioplastics – Juliette Pepin
https://issuu.com/juliettepepin/docs/bookletbioplastic



Bioplastics – Maria Viftrup @TextileLab Amsterdam

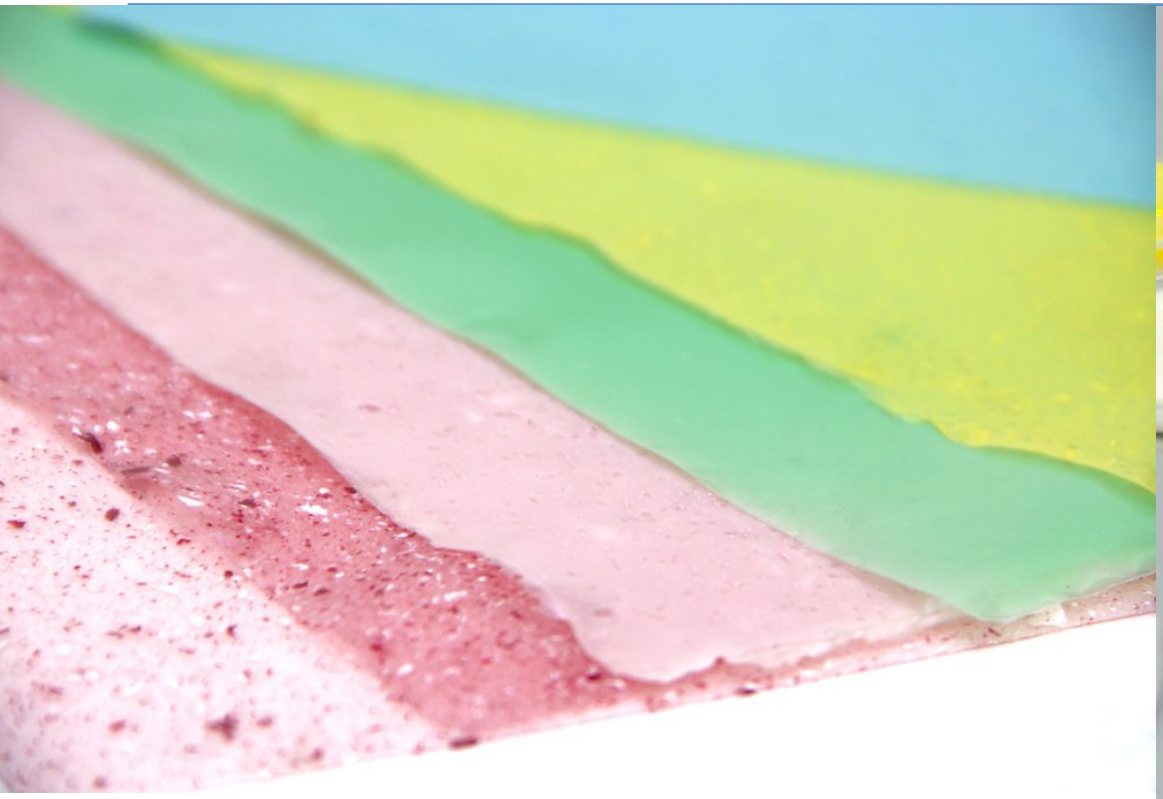


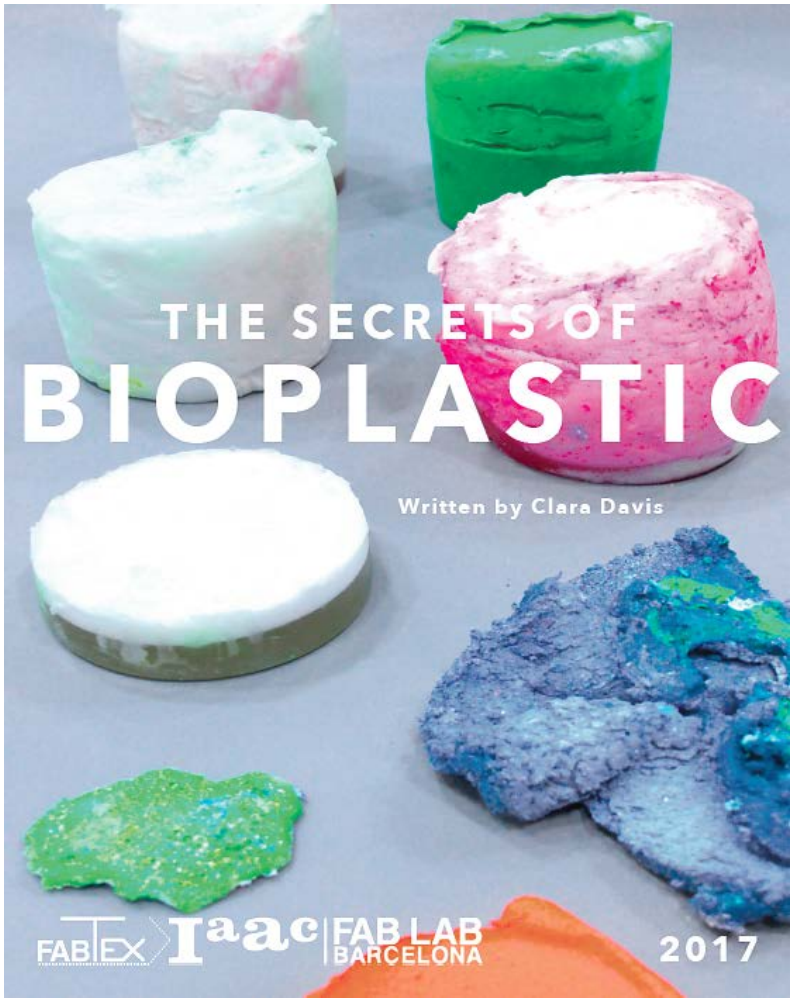
Bioplastics – Maria Viftrup @TextileLab Amsterdam

Bioplastics + JL Bacteria – Maria Viftrup @ TextileLab Amsterdam

Bioplastics – Maria Viftrup @TextileLab Amsterdam
Open Source Online Offline Material Archive

Bioplastics – Clara Davis @FabTextiles





Bioplastics – Clara Davis @FabTextiles
https://clara-davis.com/albums/bioplastic-diy/

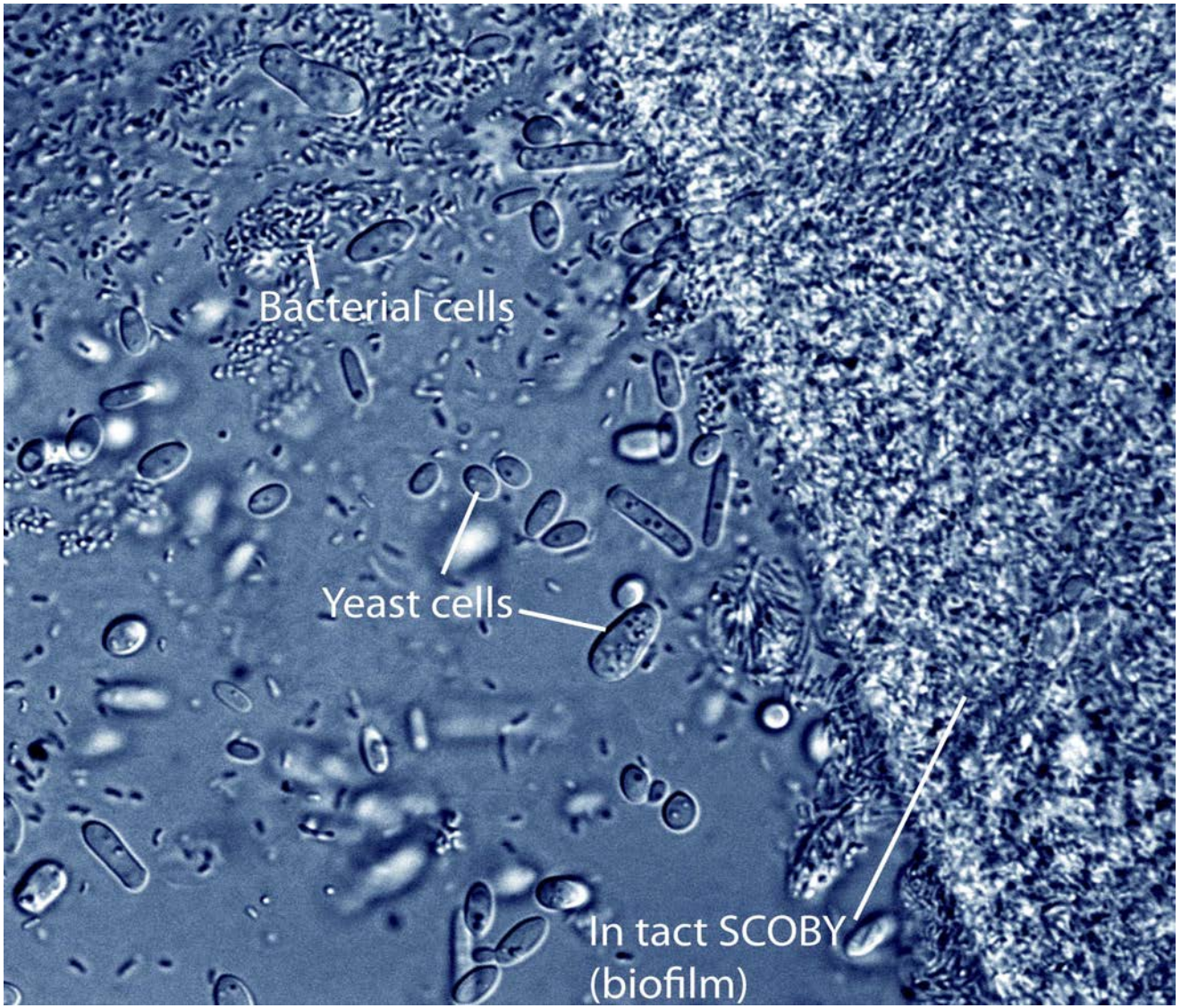
Bioplastics – Coleoptera (insect shells + bioplastics) – Aggie Hoekstra

Bioplastics with plant cellulose Psyllium Ovata - ...

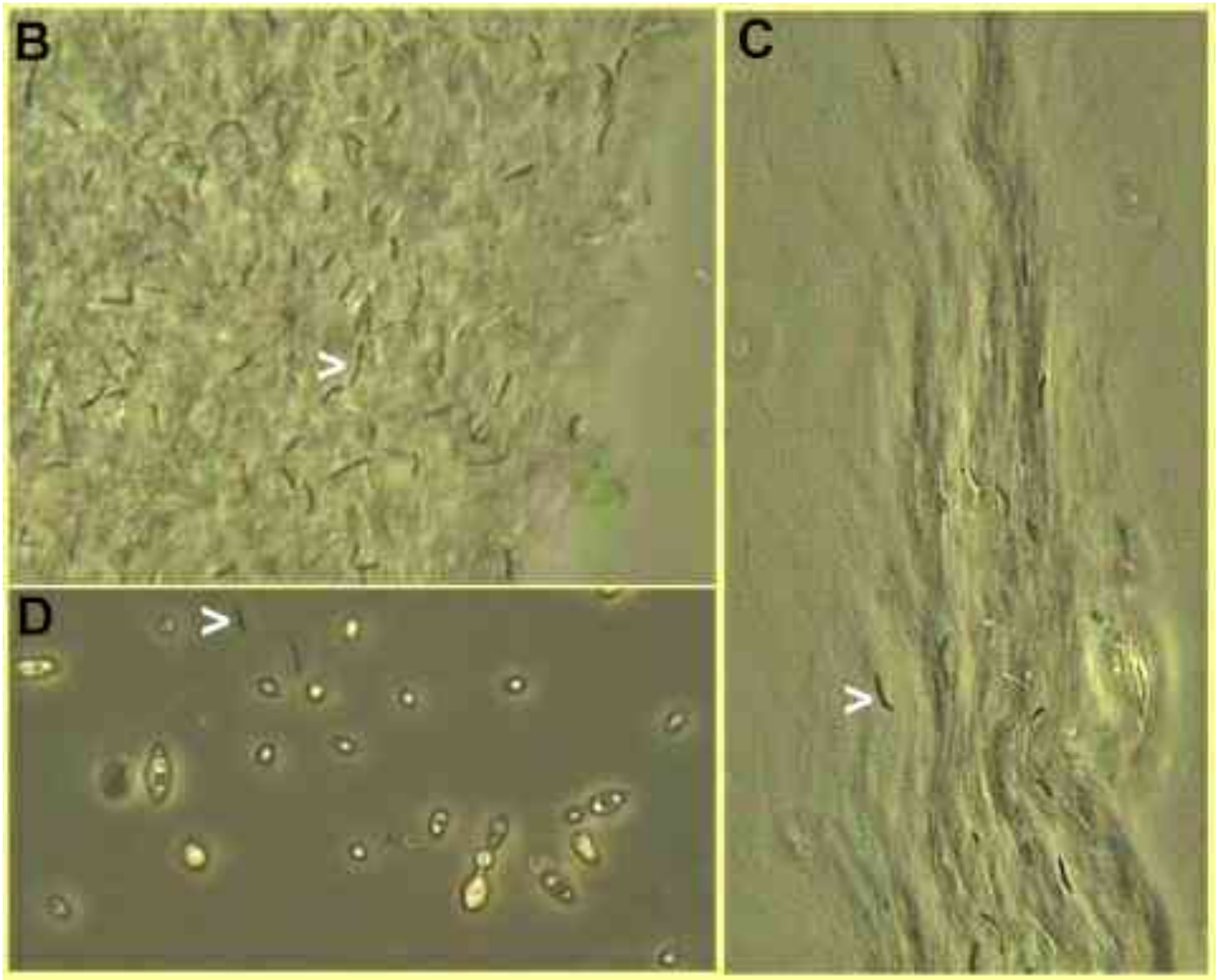
Bioplastics – Mayan Pesach

Fish scales plastic – Tessa & Maria @ TextileLab Amsterdam

Kombucha - Suzanne Lee



Kombucha – 400X – ph. Benjamin Wolfe



Kombucha – cell strcuture

HOW TO

- Brew 1 liter of tea
- Add at least 120 grams sugar, stir until the sugar is dissolved
- Measure the temperature, you are looking for ±30degrees
- Add the kombucha scooby
- Place everything in the growing tray, jar or box
- Let it grow for ±20days at 30degrees, or until you have at least 1cm thickness
- Take your wet matt out and place it to dry on a 3d shape or on a flat tray

TOOLS & INGREDIENTS

1 liter	Black or green tea
120 gr	White sugar
1	SCOBY
1	Clean container
1	Natural dyes or food dyes

TIPS & TRICKS

Depending on which type of tea you use, you will have different colours kombucha. Green tea for transparency / milky whites, black tea for rusty oranges and browns.

You can add colour to the kombucha by brewing tea combined with flowers/plants such as hibiscus, beetroot, turmeric etc.

You can apply essential oils or coconut oil for a smoother surface finishing.

The bacteria themselves will produce vinegar, but if your water is very alkaline, add a splash of vinegar. Water quality may affect your kombucha growth.

Kombucha - Suzanne Lee

Kombucha - Suzanne Lee

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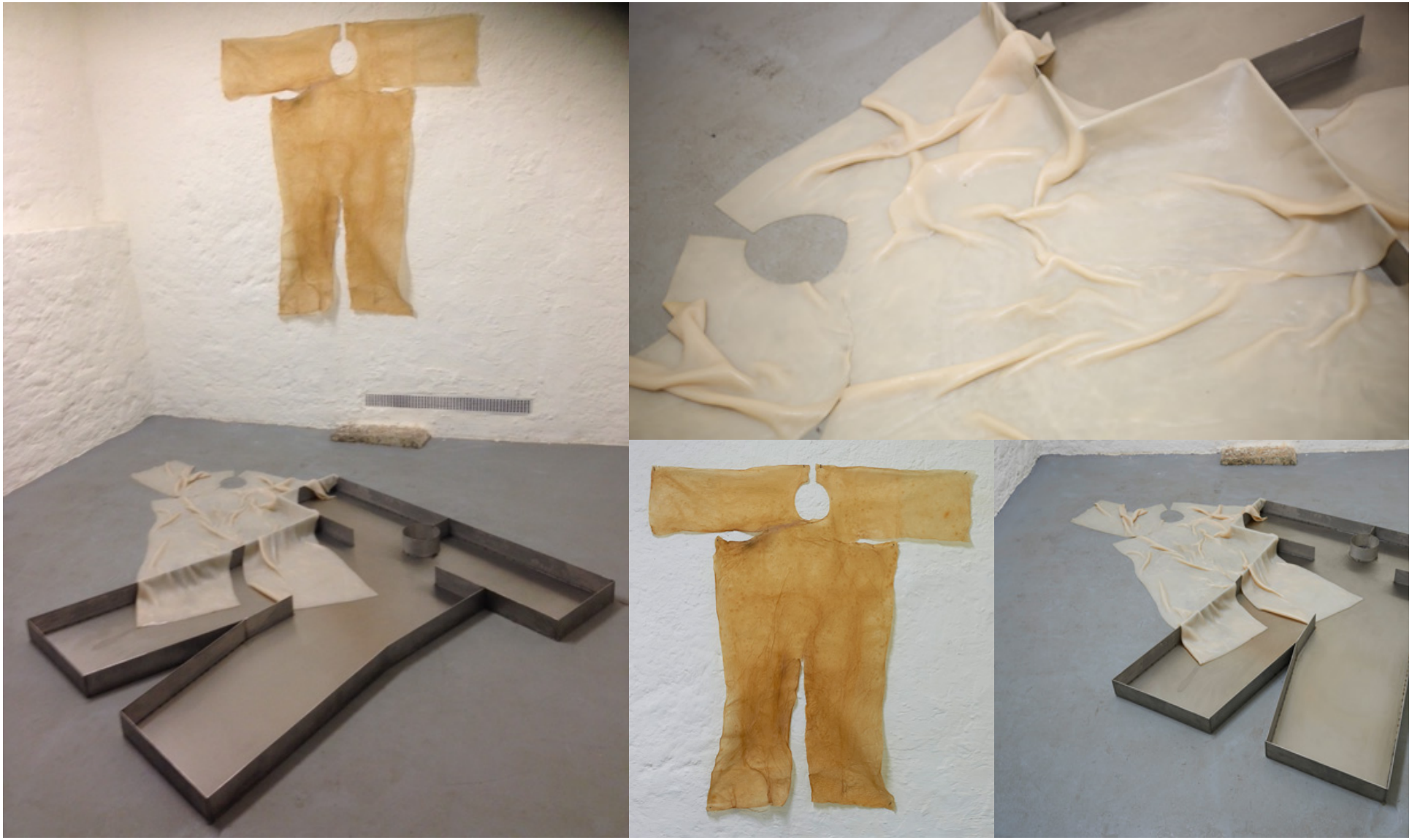
Kombucha - Suzanne Lee

Kombucha – Sammy Jobbins

Kombucha – Zionium

Kombucha – Emma van der Leest



Kombucha – Moya Hoke


FISH SKIN
LEATHER

HOW TO

- Clean the salmon skins from left over meat and pull off the scales with a blunt knife
- Choose a bottle with a wide neck
- Add the salmon skin
- Add to it in equal parts glyceryne and ethanol at 96%
- Close the lid of the bottle and mix it a couple of times a day for three days
- After 3 days: strain off the liquid in a clean container and put the skin to dry.

TOOLS & INGREDIENTS

1	Container or bottle with lid
2 or 3	Salmon fish skins
1 part	Glycerine
1 part	Ethanol 96%

Food colorants or natural dyes extracts

TIPS & TRICKS

You can add colour to the tanning process by pre-dyeing the alcohol solution. This is done by adding natural dyes extarcts to the ethanol: such as hibiscus, red cabbage, beetroot, black beans liquor, turmeric etc.

Laying the skin to dry with the scales side facing down on a smooth surface will give you a shiny finish
Laying the skin to dry with the scales side facing up will leave the scales side more open for a slightly rougher texture.

Fish skin leather– Inuits – Moma

Fish leather – Maria Hees

Fish leather – Nienke Hoogvliet

Fish leather – Nienke Hoogvliet

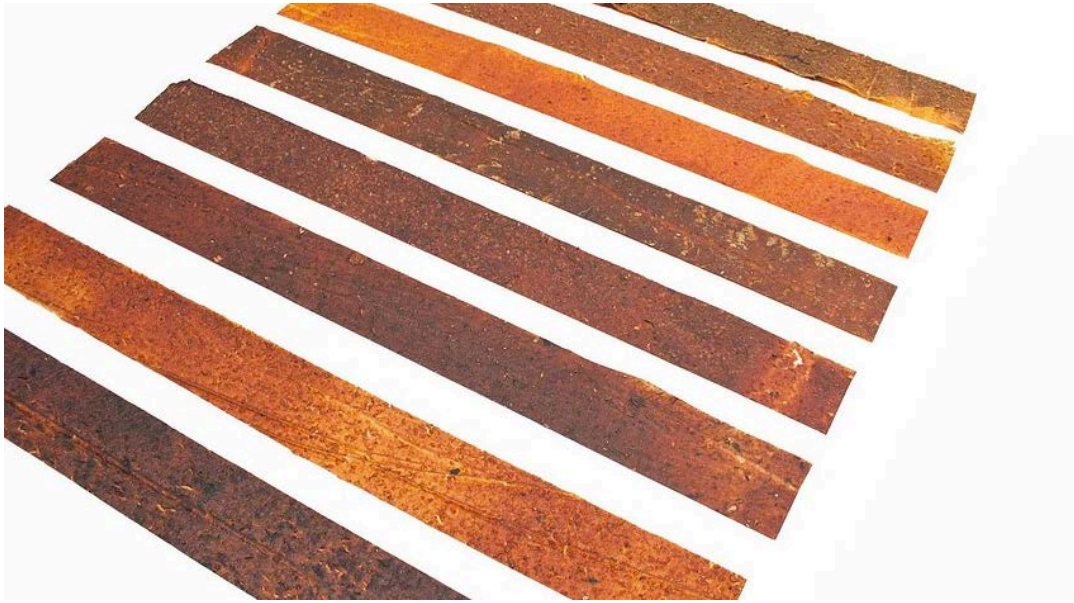
Fish leather – Nienke Hoogvliet

Jelly fish leather – Jurii Kasao


FRUIT
LEATHER

TO DISPOSE THE TRASH IT COSTS
THE STAND OWNERS 12 EURO CENTS PER KILO.

Therefore some market vendors are tendend to illigiaily dump their waste. Out of this problem our project was born. For months we weekly collected the “waste” from the market. Trough a particular process we created a new material. Original Rotterdam Fruitleather.



Fruit leather – fruitleather Rotterdam

Fruit leather – fruitleather Rotterdam

Fruit leather – Elise bauer


TEMPEH
LEATHER

Tempeh leather – Soya c(o)u(l)ture - XXlab

Tempeh leather – Soya c(o)u(l)ture - XXlab


MUSHROOM
LEATHER

Mycelium leather – Aniela Hoitink

Mycelium leather – Aniela Hoitink

Mycelium leather – “growing lab” – Maurizio Montalti

Mycelium leather – “growing lab” – Maurizio Montalti

Mushroom leather – “Muskin” - Gradozero

Mycelium leather – Mycoworks

Resources

MYCELIUM TECHNOLOGY

Advanced Materials From Fungal Mycelium
Mediamatic: Mycelium Knowledge
Studio Murmur: Mycelium Material Study
Biodegradable Architecture: Finite Constructions for Endless Futures
IAAC: Mycotcture GR2 - Building From Mushrooms
IAAC: Mycotecture - Growing Into Form
Recycling: Mycology, Materials Science and Architecture
mycoFARMX_Living Architecture
Renatured: Making Mycelium Material - Some Loose Protocols

-

MYCELIUM DESIGN

Mycotecture
Mycelium Furniture: Yamanaka Collection
Officina Corpuscoli: Mycelium Design
Fungal Futures
The Living: Hy-Fi
Mycoform
Dezeen: Mycelium Design

MUSHROOM 101

Mycelium Running
The Fifth Kingdom
Cornell Mushroom Blog
Fungi Perfecti: Mushroom Information
North American Mycological Association
World of Fungi (David Moore)
Tom Volk's Fungi
Radical Mycology
The Fungus Among Us - Reading List

PIONEERS

Evocative
Mycotech
Mogu

Mycelium leather – Mogu

Fungal Futures exhibition – Ff-
http://www.fungal-futures.com


HI-TECH
LAB GROWN
LEATHERS

Lab grown skin– “Pure Human” Tina Gorjanc

1 Take base pairs of DNA

DNA is the molecule that carries instructions on how an organism functions. Think of it as software code.

2 Cut and replace with new base pairs to create new, unique strands of DNA

The sequence of bases determines the information available for building an organism, similar to the way in which letters of the alphabet appear in a certain order to form words and sentences. We edit DNA to instruct our cells to manufacture the type and quantity of collagen we need.

3 Put the new DNA into cells and multiply them

Cells are the basic building blocks of all living things. They feed on the nutrients supplied and convert those nutrients into energy, making copies of themselves and rapidly multiplying tens of cells into billions of cells.

4 Cells produce the protein collagen

These cells produce collagen and other proteins essential for creating leather. Collagen is the most abundant protein in the animal kingdom.

5 The collagen groups together to form a triple helix collagen molecule

The triple helix structure of collagen then forms into fibrils.

6 The collagen molecules form a network of fibers

These fibrils are nanofibers which join to form bundles called fibers.

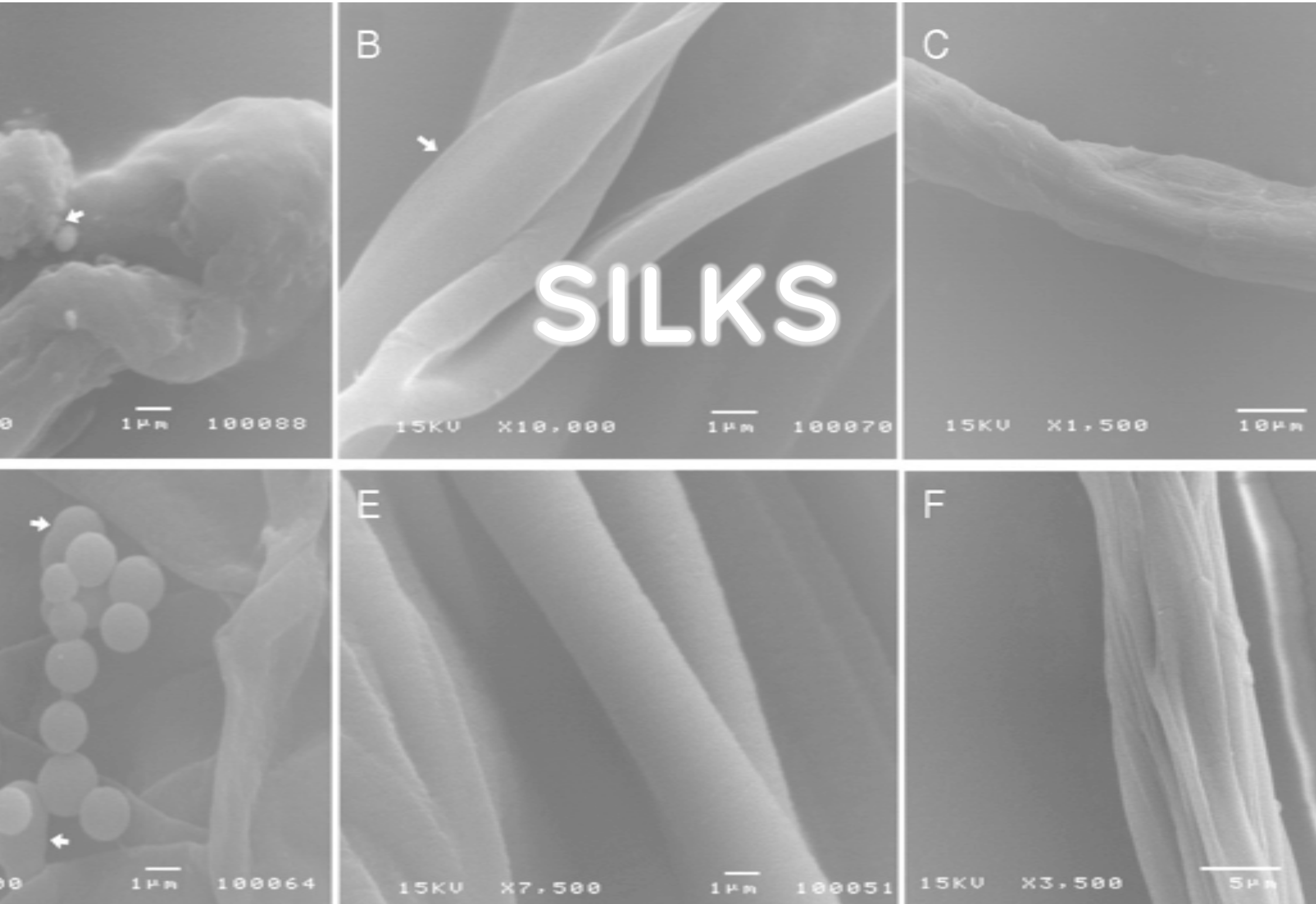
7 The fibers are assembled to create the material structure

Using some secret sauce, we further process these protein structures to create our unique Modern Meadow materials.

8 The leather material is then tanned and finished

Our materials are finished in an environmentally responsible, reduced tanning process.

Zoa – Biofabricated lab grown leather


B
C
SILKS
1µm 100088
15KU X10,000 1µm 100070
15KU X1,500 10µm
1µm 100064
E
15KU X7,500 1µm 100051
F
15KU X3,500 5µm

Spider Silk – Simon Peers & Nicholas Godley

Spider Silk - Adidas

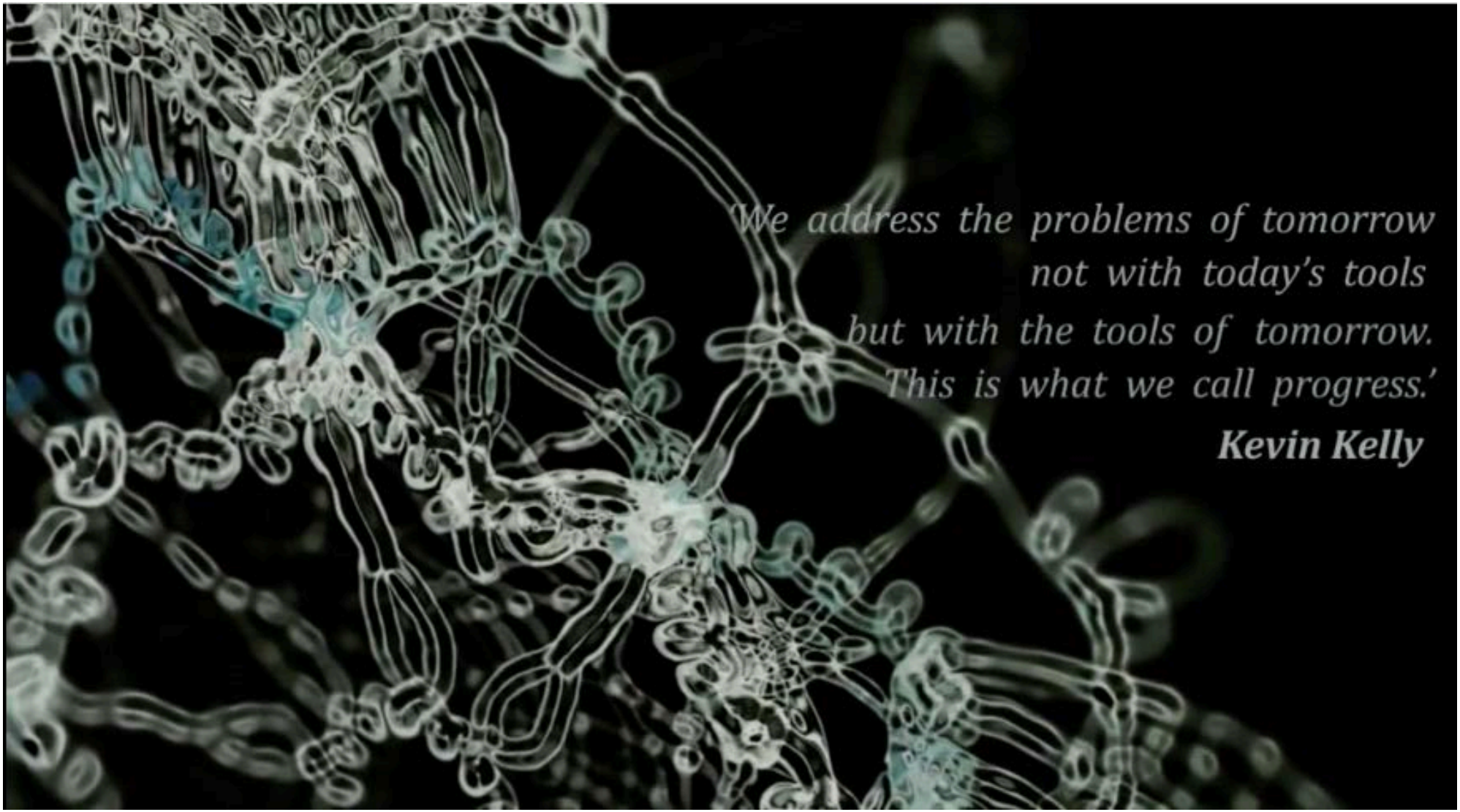
Spiders produce silk fibers with remarkable properties including high tensile strength, elasticity, durability and softness.

We've developed technology to replicate this amazing process sustainably at large scale. Our knit ties are our first prototype product, available in a limited edition release.

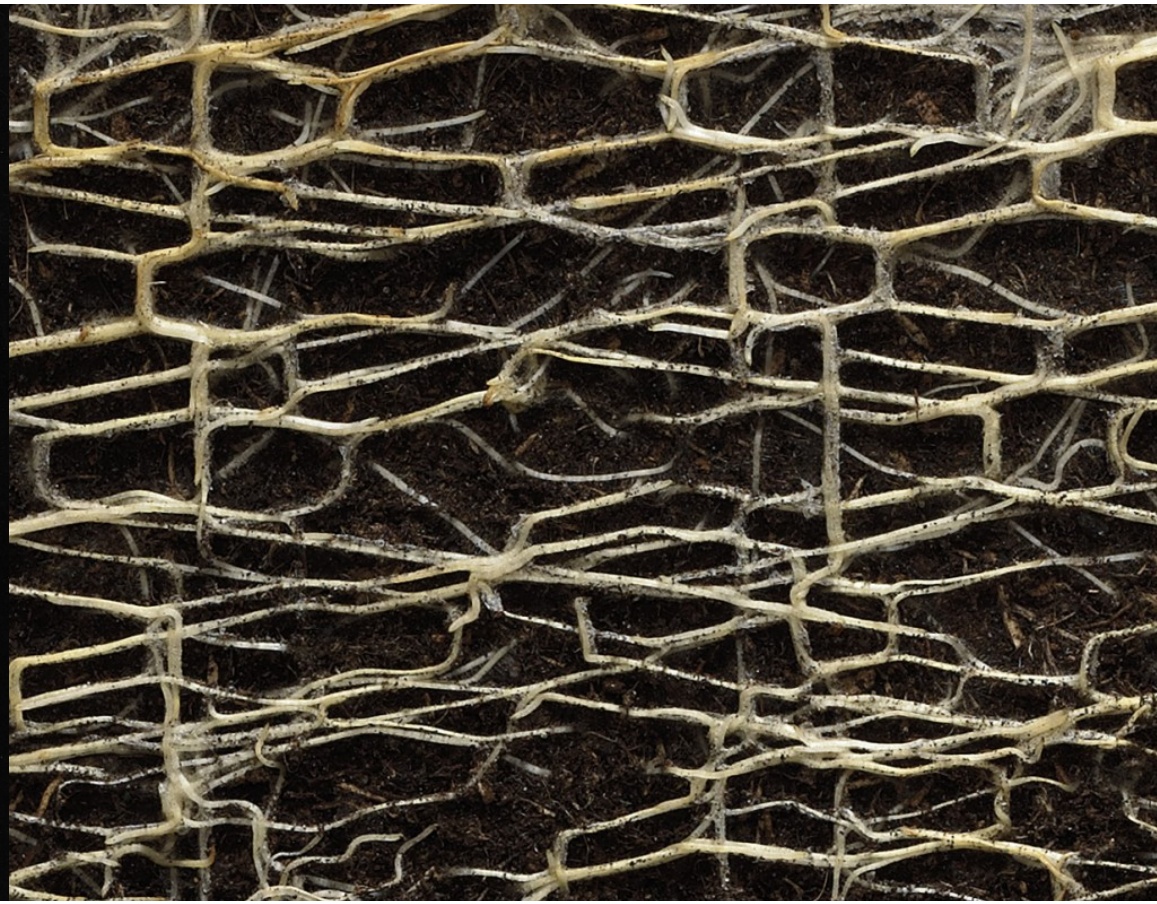
Spider silk – Bolt threads


NATURE &
COOPERATION

Natural laces – Carole Collet



Genetically-engineered plants that produce edible textiles – Carole Collet
https://vimeo.com/80612467



Rootsystem domestications – Diana Scherer

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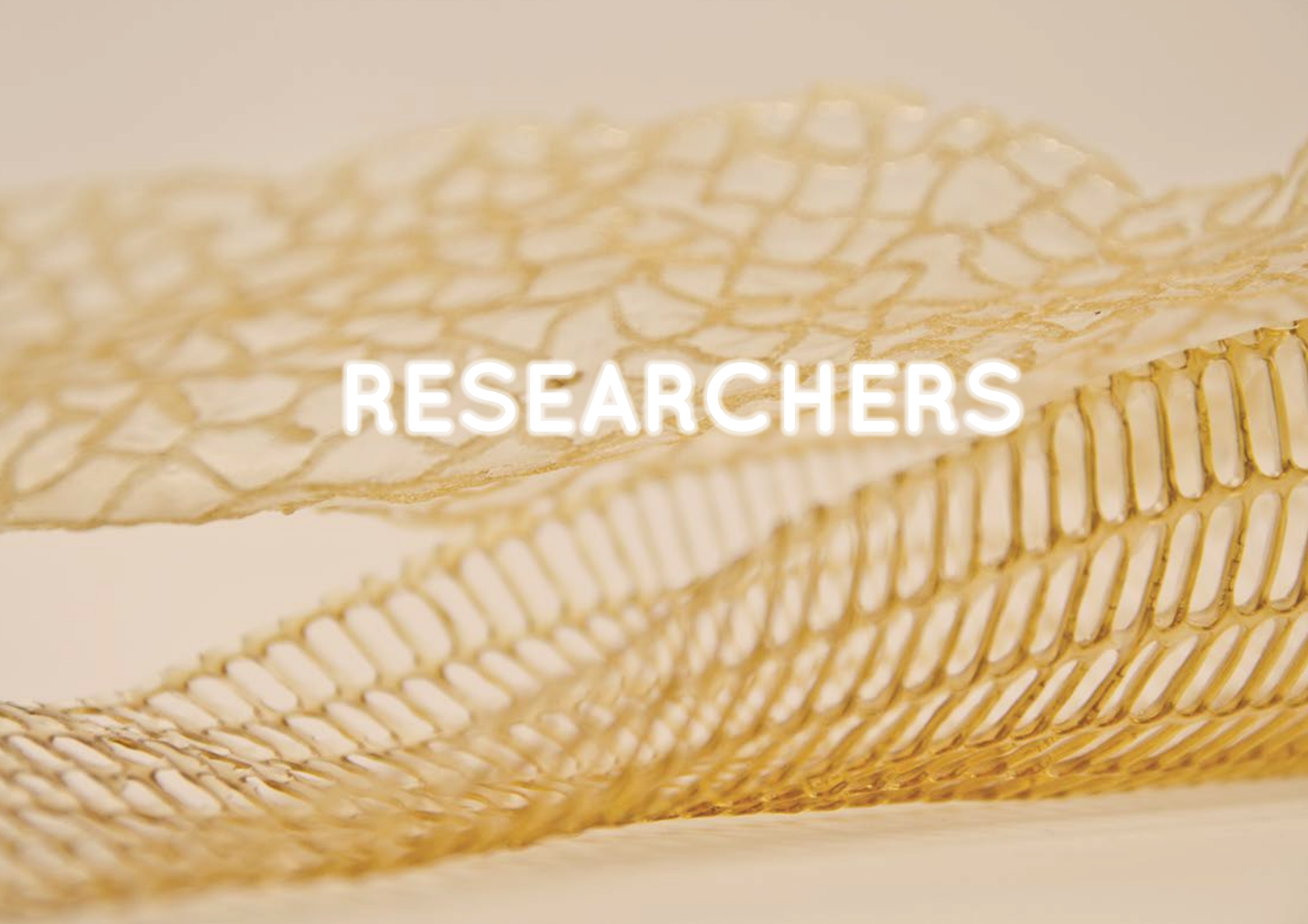
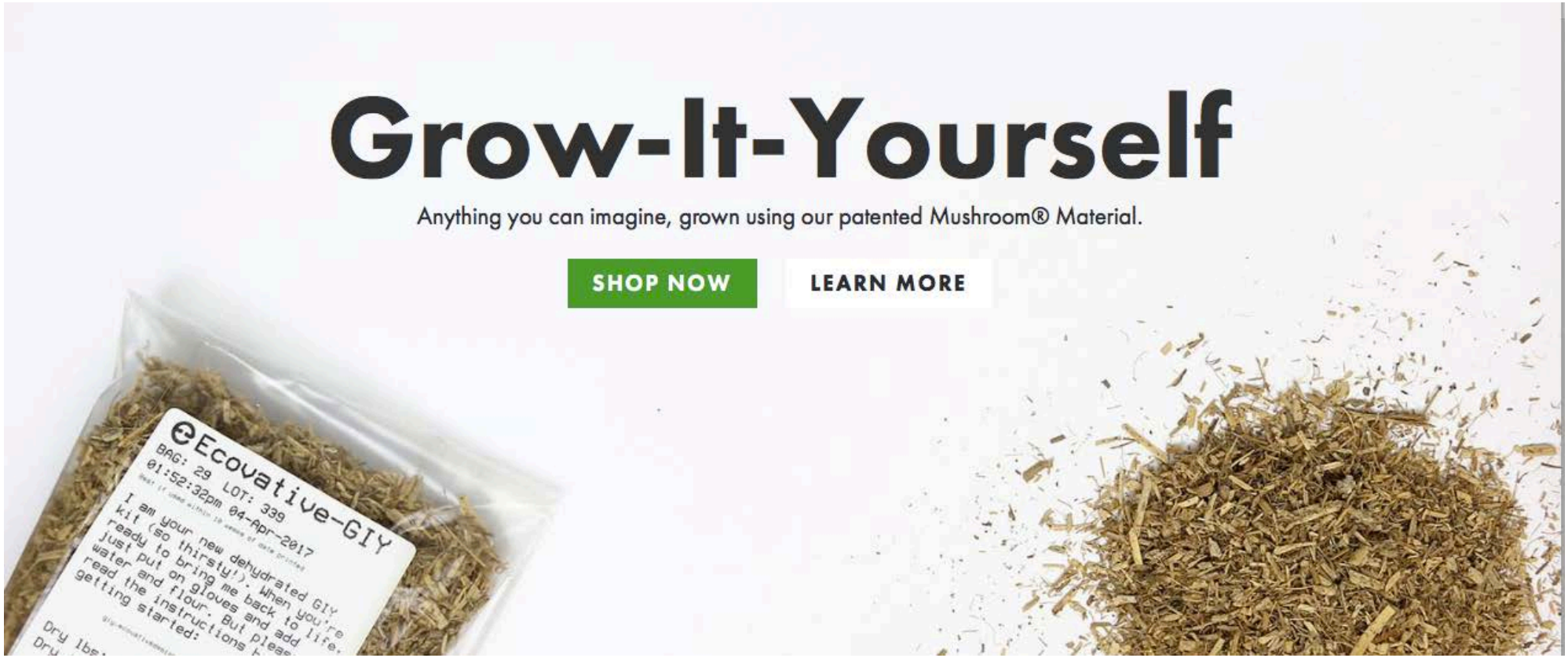

RESEARCHERS

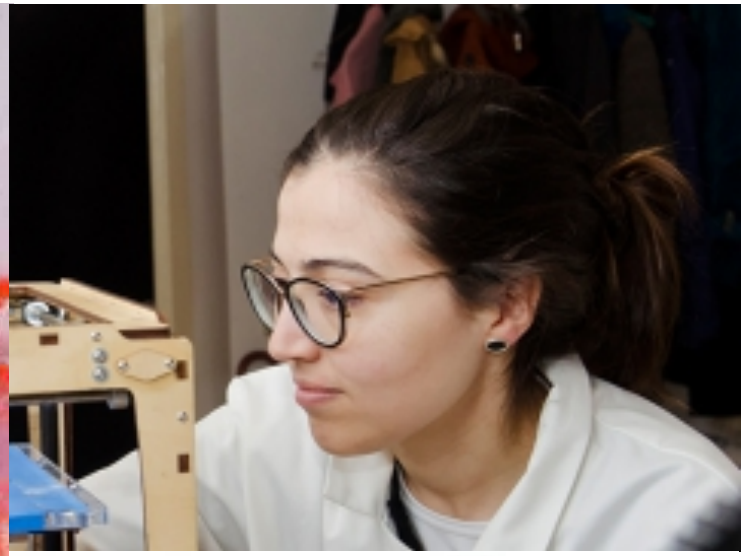
Annelie Koller - Cultivate

Emma van der Leest

Maurizio Montalti – Officina Corpuscoli



Ecovative – Mycelium GIY

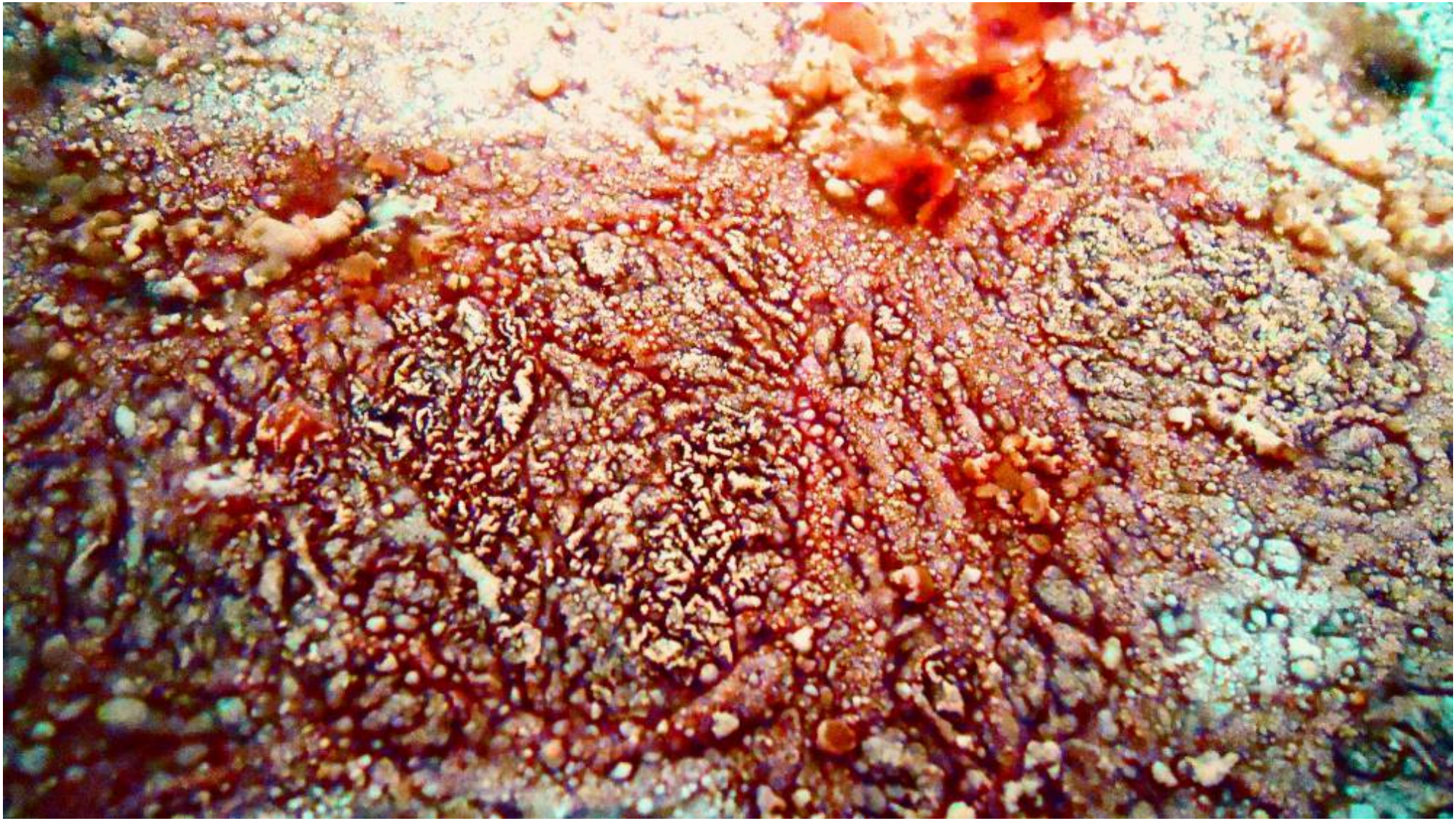


petshop

Maria Boto – Pet-it / PetShop Waag Society

Amy Congdon

Maria Viftrup – Viftrup.com



Superficie Fermentada MX

ASSIGNMENT

Explore at least:

- **1 natural dye or bacterial dye**
- **1 crafted or grown material**

Dont just reproduce, mix, match, change amounts or patterns and compare.

Order, display, map / compare and credit, for the process and the results:

- **Ordering** – organised material is knowledge. Name your materials, classify them by typology.
- **Displaying** – display them in a way that makes sense. Badly displayed materials, loose all their beauty.
- **Mapping** is essential for comparing results. Change small elements in a recipe and compare the results.
- **Credit** your recipes and changes