MARTINA MURONI

Wool & Flow

Credit: Marie Tregoat,
Le Textile Lab

Starting from Sardinia

More sheep than people

Tradition of wool textiles

Rustic wool underutilized

Woolshed

European project addresses the underutilization of Alpine wool

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Thônes et Marthod

Rustic French wool


8 TONS DISCARDED ANNUALY
only 350 kg saved by a wool association
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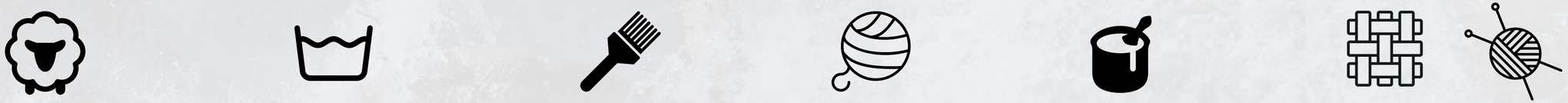
Standard process

WATER, ELECTRICITY, FUELS, CHEMICALS

SHEARING → WASHING → CARDING → SPINNING → DYEING → WEAVING/KNITTING



FOCUS:

Rethinking water use in rustic wool processing

Water role

BIOLOGICAL MEDIUM

Washing

CHROMATIC CARRIER

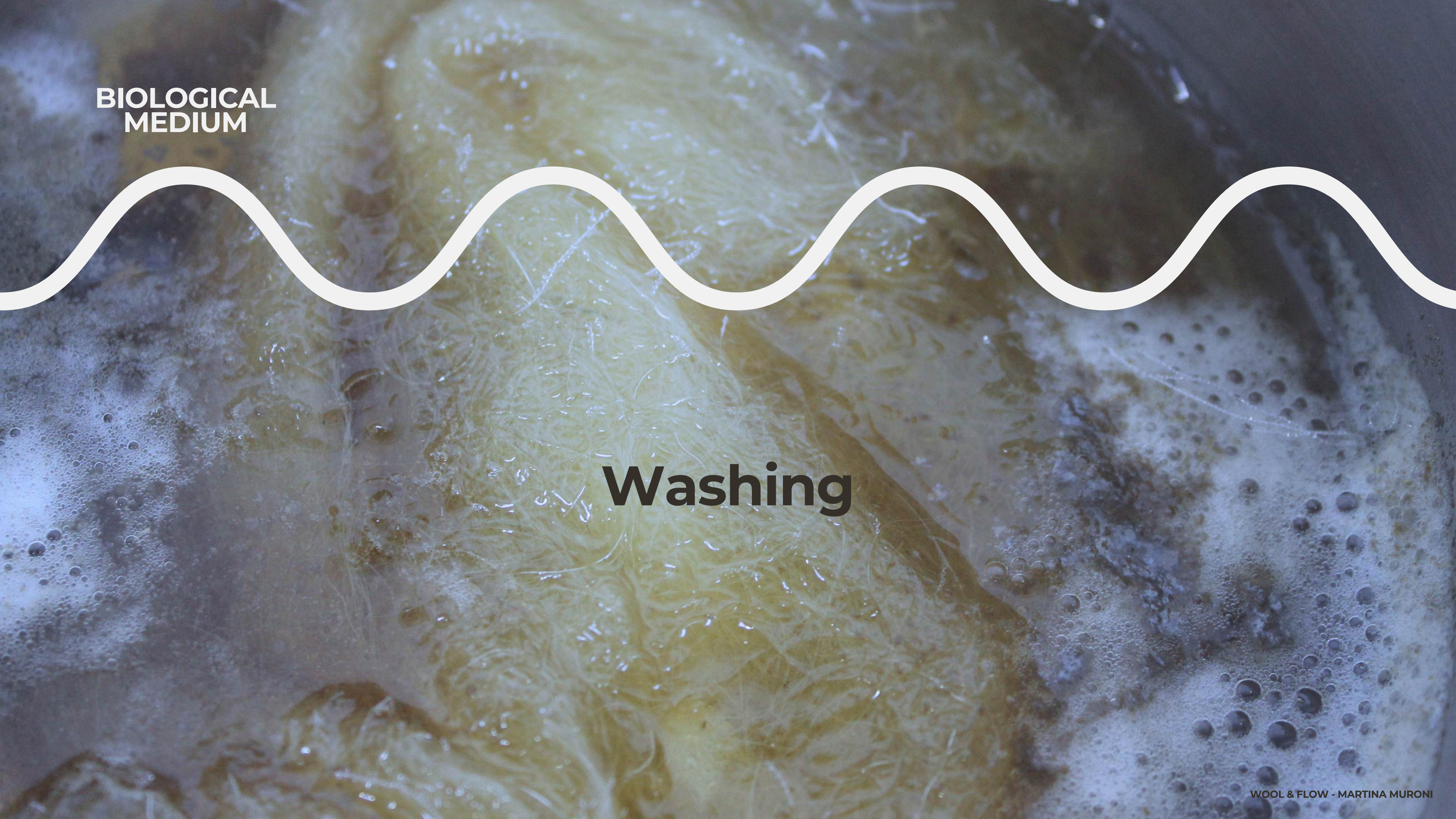
Dyeing

FIBER ACTIVATOR

Felting

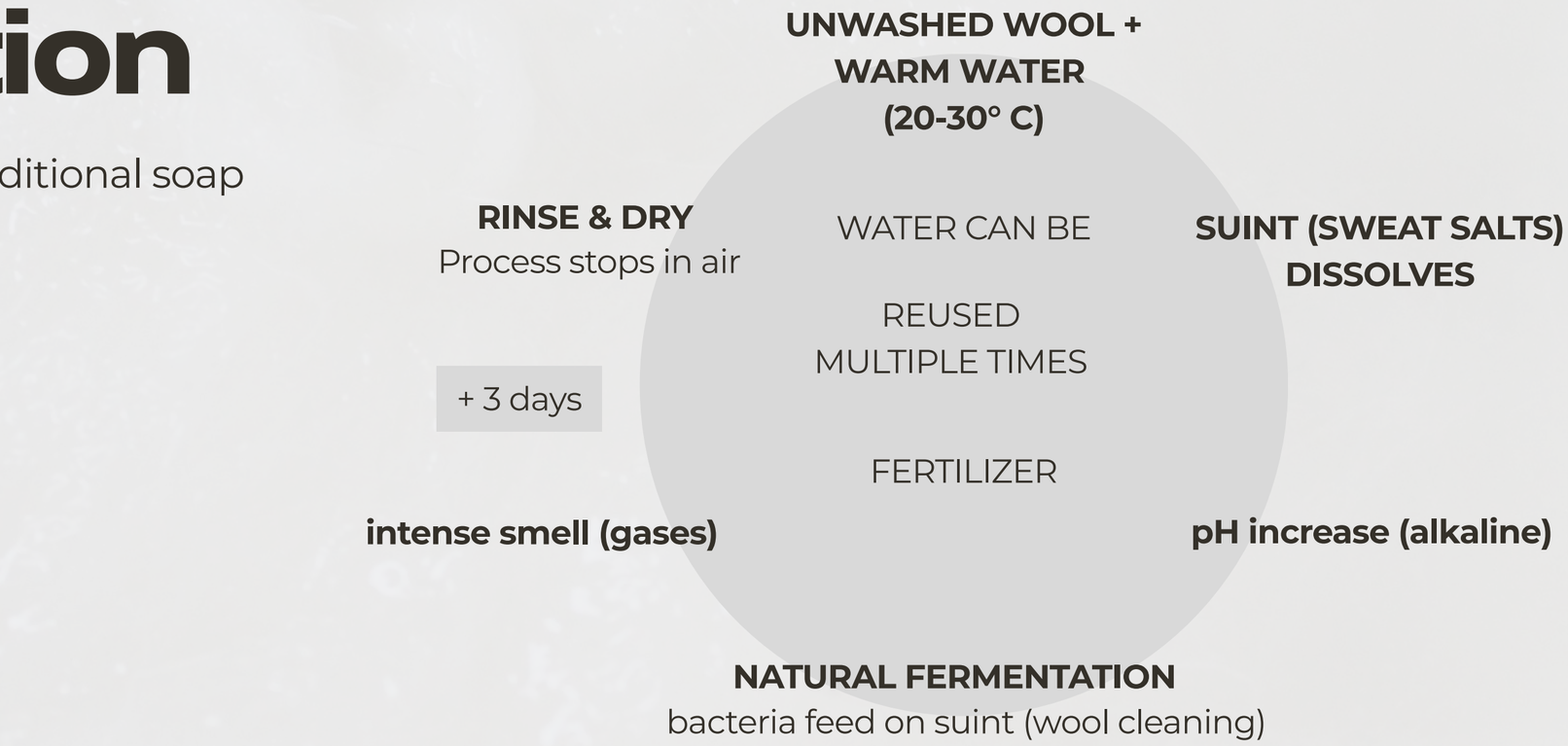
MATERIAL MEDIUM

Biocomposite


BIOLOGICAL
MEDIUM
Washing

Suint Fermentation

Washing with rainwater and no additional soap



Laboratory setup to wash up to 10 kg

Washing systems comparison

Indicator	Fermentation	Industrial*	Micro-Scouring**
Water Use (L/kg)	**10 L/Kg**	15 L/kg	50 L/kg
Temperature	**20-30°C**	60–70°C	50–80°C
Synthetic Chemicals	**None**	Yes (alkali + detergents)	Soap / detergent
Effluent Outcome	**Regenerative water (reused)**	Industrial wastewater	Sewage system
Energy level required	**Low**	High	Medium

*Industrial scouring, as described in textile processing literature (e.g., multi-bowl washing systems).
**Micro-scouring plant from "Laver la Laine", Atelier Laine d'Europe.


CHROMATIC
CARRIER
Dyeing

Natural Dyeing

Alternative to chemical colors

Local resources

Territorial water and plant dyes

Process simplification

No scouring and separate mordanting

Circular Colour

Dye bath reuse and pigment extraction

Local dyeing material

credits

NAME	COLOUR	COUNTRY
Chamomile (Anthemis spp.)	Yellow	**Slovenia**
Madder (Rubia tinctorum)	Red	**Italy**
Nettle (Urtica dioica)	Beige	**Switzerland**
Oak galls (Quercus spp.)	Beige/Pink	**Austria**
Walnut husks (Juglans regia)	Brown	**France**

Dyeing tests

Tap water (TAP) ph: 8 - Rain water (RAIN) ph: 5.

Low-concentration iron, tested with a lower-impact method.

Chamomile (Anthemis spp.)

MORDANT IN DYE BATH

Nettle (Urtica dioica)

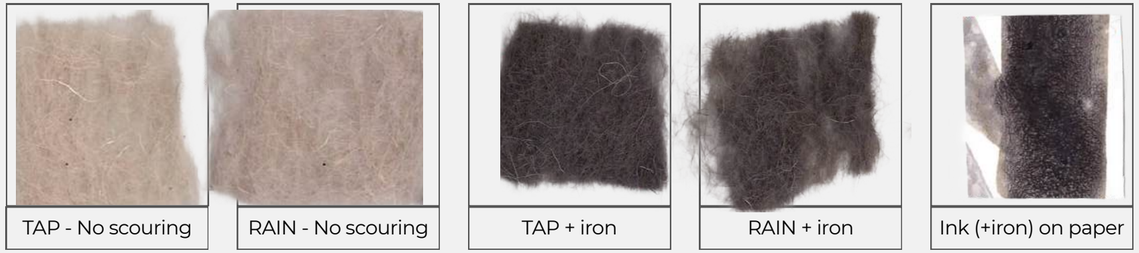
MORDANT IN DYE BATH

Madder (Rubia tinctorum)

MORDANT IN DYE BATH

Oak galls (Quercus spp.)

NO MORDANT



Madder (Rubia tinctorum) - Second bath

MORDANT IN DYE BATH

Walnut husks (Juglans regia)

NO MORDANT


FIBER
ACTIVATOR
Felting

Felting

Water, soap and friction to create a dense fabric.

Needle felting reduces water use

Modern technologies reduce manual effort

Technology interventions




TOOL	FeltLOOM	Felting gun	Rolling pin	Sanding machine
TECH LEVEL	High	Medium	Low	Medium
MANUAL EFFORT	Low	Medium	High	Low

Sample paremeters: observation time (10 mins), wool weight (50 g), size (25x25 cm), layers (4)

Experimenting pieces

Bag
wet felting, details with needle felting
rolling pin and felting gun

Vest
wet felting
sanding and washing machine


MATERIAL
MEDIUM
Biocomposite

Wool biocomposite

In combination with natural binders as innovative material

Water as ingredient (locally sourced or dye bath)

A replicable workshop for community learning

WOOL-ALGINATE WORKSHOP — RECIPE

MATERIALS
- 12 g Alginate
- 20 g Glycerin
- 400 ml
- 10 g seed oil
- Calcium Chloride solution (10 g calcium chloride per 100 ml water)

Note: double/triple the dose based on the number of participants.

- Food-waste powder ingredients (e.g. orange peels, banana peels, coffee grounds)
- Wool fibres (washed and carded, optional test with unwashed wool)

TOOLS
- Containers or mixing bowls
- Digital balance
- Spatula
- Mixer
- Paper towels
- Spray bottle
- Embroidery hoops and texture dense fabric
- Dehydrator (optional)
- Grinder (fine powders)
- Camera/smartphone for documentation
- Printer, papers and markers for sample tracking

INSTRUCTIONS

Step 1: Prepare the sodium alginate mix
- Add the sodium alginate to the water.
- Blend the mix until it becomes homogeneous.
- Add the glycerine and blend again.
- Place in the fridge overnight, to lose bubbles.

Step 2: Prepare the calcium chloride mix
- Mix 100ml of water with 10 grams of calcium chloride.
- Stir until completely dissolved.
- Place the mix in the sprayer bottle and shake the bottle before use.

Step 3: Prepare and spray the mold
- Take the waterproof texture dense fabric, place and fix it in the embroidery hoop.
- Spray the textile mold with calcium chloride.
- Remove excess with a paper towel.

Step 4: Pour and spray the mix
- Pour the mix onto the textile mold.
- Tap the mold so the mix distributes evenly over the surface.
- Spray the surface of the mix with calcium chloride.
- Remove excess with a paper towel.

Step 5: Dry
Let dry over a radiator or in a food dehydrator (40°C for 24 hrs)

Step 6: Remove from the mold
- Take out of the frame after 7 days.
- Pull slowly from the border of the bioplastic until completely detached.

WOOL-ALGINATE WORKSHOP — ROLES

FACILITATOR

BEFORE THE WORKSHOP:
- Prepare and label powder ingredients in jars
- Prepare calcium chloride solution and alginate mixture (step 1 and 2)
- Cut wool fibres into smaller pieces (washed and unwashed)
- Prepare sample documentation sheets
- Prepare sample storage area

DURING THE WORKSHOP:
- Introduces workshop concept and materials
- Guides participants through process
- Supports safe and inclusive participation

AFTER THE WORKSHOP:
- Checks drying process in the lab
- Ensures each sample sheet is associated to the material sample
- During second meeting with participant (if planned), shares dried materials and collects reflections on possible applications and future experimentation.

PARTICIPANTS
- Select the wool and powder ingredients and record your choices in the sample sheet
- Prepare the mold: first spray the calcium solution, add the ingredients, then pour in the alginate mixture. Spray again with calcium chloride and let it dry
- Share feedback on the experience and material observations
- Enjoy the session!

DOCUMENTATION LEAD (Facilitator/assigned person)
- Collects participants' consent for photos and videos
- Documents the process through photos and videos
- Archives results for open knowledge sharing and gathers participant feedback

BIOCOMPOSITE

DATE: PARTICIPANT:

FIBRE INFORMATION
Wool type / breed (if known):
□ Washed □ Unwashed □ Carded □ Other: _____
Approximate fibre weight (if measurable): _____

COMPOSITE RECIPE
Food-waste fillers used:
Powder granulometry (fine/coarse/mixed):
Quantity of fillers: □ Low □ Medium □ High □ Weight: _____

WATER TYPE (TAP, RAIN, DYE BATH): _____

OBSERVATIONS (TEXTURE, FLEXIBILITY, ETC):

REFLECTIONS/APPLICATIONS:

Printable version

Biocomposites Archive

*Alginate refers to the full mixture (incl. additives)

Rain water
Alginate: 98g
Washed wool

Madder dye bath
Alginate: 105 g
Washed wool: 4.8 g

Madder dye bath
Alginate: 119 g
Washed wool: 3 g

Madder dye bath
Alginate: 130 g
Washed wool: 1.5 g

Walnut dye bath
Alginate: 235 g
Wool: 5.4 g

Tap water
Alginate: 100 g
Unw. wool: 10 g

Rain water
Alginate: 211 g
Washed wool: 6 g
Orange filler: 6.20 g

Rain water
Alginate: 81 g
Washed wool: 2.4
Orange filler: 1.5 g

Rain water
Alginate: 85 g
Washed wool: 2 g
Orange filler: 15 g

Tap water
Paper pulp
Unwashed wool: 1g

Tap water
Alginate: 70 g
Washed wool: 5 g

Tap water
Alginate: 70 g
Washed wool: 1 g

Tap water
Alginate: 70 g
Washed wool: 8 g

Tap water
Alginate: 70 g
Washed wool: 10 g

Tap water
Agar: 1 g
Washed wool: 2 g

WHAT'S NEXT

Expanding the research and exchanging knowledge

Testing suint fermentation on other sheep breeds and sharing the process with wool producers.

Black Thônes et Marthod

White Thônes et Marthod

Marron des Aravis

Exploring potential applications of wool biocomposites

Further exploration of water interaction in natural dyeing, including fermentation.

Joining events to learn and rethink wool collectively

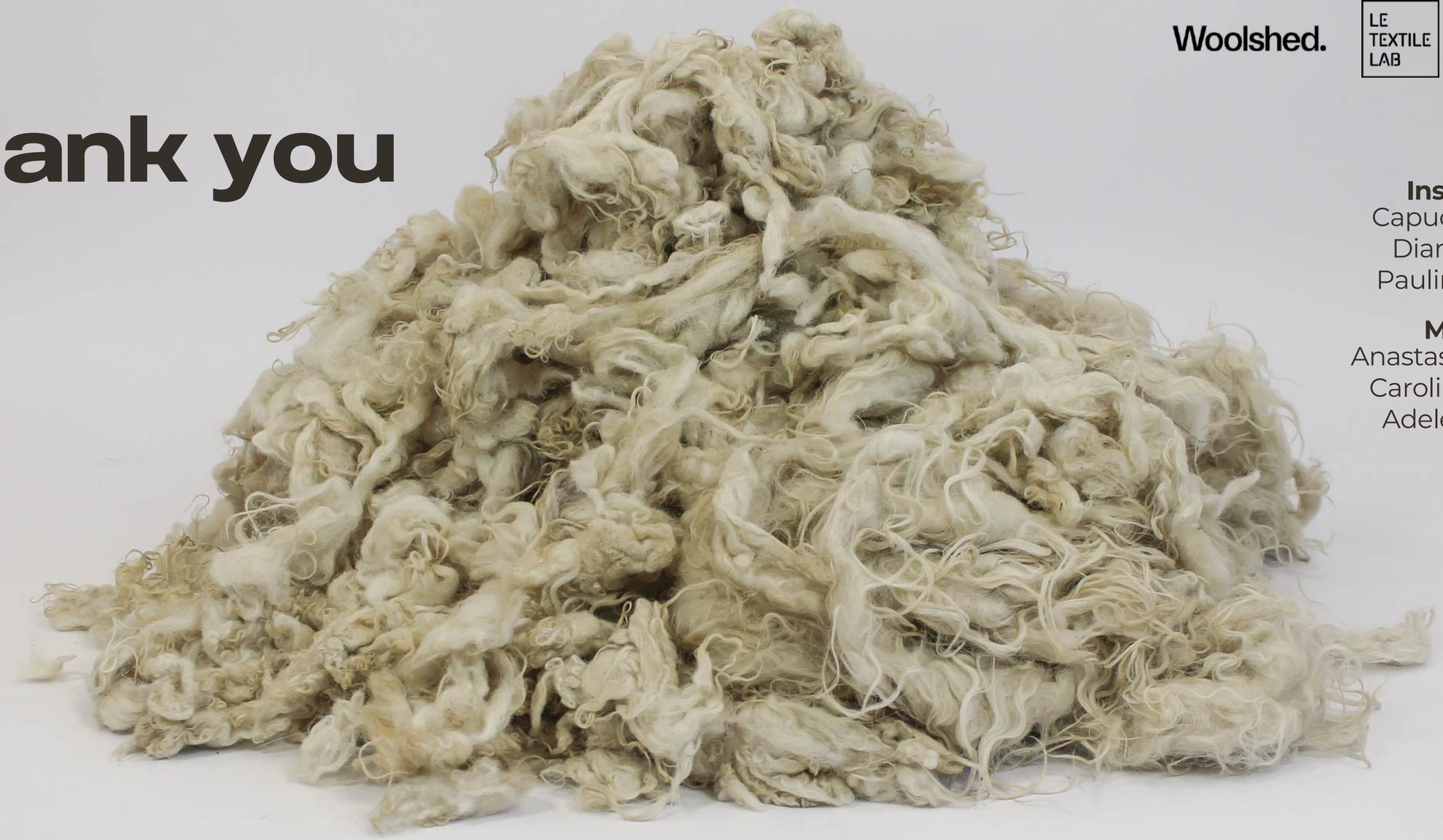
The community around wool

Their knowledge and guidance helped me shape this project.

Play video

Wool & Flow
MARTINA MURONI

Thank you



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