

The background is a complex, abstract composition. It features dark, almost black, textured areas that resemble crumpled paper or organic matter. Interspersed within these dark regions are numerous small, bright, and irregularly shaped bubbles or droplets, creating a foamy or cellular appearance. A prominent, diagonal, light brown or tan textured strip, possibly representing a piece of cardboard or a different material, cuts across the lower right portion of the image. The overall effect is one of organic complexity and material experimentation.

Creative Biomaterials Design Workshops: Using Different Bio-Waste Streams to Develop New Biomaterials

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“GIRIA LAB”
Evelina Kudabaitė

“Giria Lab” Biocomposite Material Fabrication Workshop with object designer Evelina Kudabaitė, whose experimental and intuitive practice explores the dialogue of contrasting materials—their tension and harmony—creating unexpected, sculptural, and functional design solutions.

The aim of this creative workshop is to discover new material relationships arising from wood-industry by-products. Pine resin (colophony/rosin), pine bark, and wood dust merge to form new structures, functions, and aesthetics. Using natural pigments and varying proportions, the resulting material will differ markedly in color and texture.

Participants will learn to produce one flexible and one rigid sample of biocomposite material and will be introduced to possibilities for forming this material and applying it in object design.



INGREDIENTS

Colophony (Pine rosin)

Gelatine

Ethanol

Glycerine

Water

Tree bark powder

Sawdust

TOOLS

Kitchen scale

Small cooking pot

Silicone spatula

Mortar and pestle

Silicone mat

Stovetop

Oil

RECIPE

FIRM BIOPLASTIC

10 g Gelatine

20 g Water

20 g Colophony

20 g Ethanol

SOFT BIOPLASTIC

10 g Gelatine

40 g Water

15 g Colophony

15 g Ethanol

5 g Glycerin

- 1 Weigh all the ingredients in advance.
- 2 Pour cold water over the gelatin. Leave it to bloom.
- 3 If the colophony is in chunks, crush it into powder.
- 4 Gradually sprinkle the rosin powder into the ethanol and stir until it dissolves, stirring while gently heating.
- 5 Stir the bloomed gelatin and gently heat it so it melts. Gradually pour the melted gelatin into the warm rosin, stirring until it becomes a uniform mixture.
- 6 (For the flexible version) Add the glycerin at the end while stirring.
- 7 Gradually add the pigments until the desired consistency is reached. For the hard version, add fiber powder until the mixture becomes kneadable; for the flexible version, add half as much—just enough for the mixture to remain thick and liquid.
- 8 Shape the bioplastic mass by hands, and spread the liquid mixture with a spatula onto an oil-coated silicone surface. The liquid mass can also be poured into molds.







“COFFEE GROUNDS ALCHEMY”

Gabija Medeinė Kukevičiūtė

Creative Biomaterial Design Workshop “Coffee Grounds Alchemy” with Gabija Medeina, founder of the ecological design studio “Kavatūta.” In her work, she explores the intersections between coffee culture and sustainable design, seeking to reveal the aesthetic and functional potential of coffee waste.

The aim of this creative workshop is to give new life to used coffee grounds by turning them into a sustainable material resource. Participants will learn how to repurpose coffee waste to create small interior objects such as bowls or trays. The workshop invites participants to experience a slow, hands-on creative process – shaping, decorating, exploring material properties, and immersing themselves in a calm, meditative making practice using coffee grounds.

The workshop encourages exploration of circular design principles and local resource potential – here, coffee grounds become an alternative raw material that inspires participants to rethink material value, life cycles, and their connection to everyday creation.



1. COFFEE CLAY – SOFT & SLIPPERY BASE (for kneading, sculpting, forming compostable design objects)

INGREDIENTS (1 small batch)

16 g Starch

15 ml Lemon juice

15 ml Water

9 ml Liquid honey

Dried spent coffee grounds –
add gradually “by eye” until
the mixture binds and becomes
moldable

Note: Coffee grounds should
be used, dried, and crumbly
(not wet), so the clay doesn’t
turn sour or take too long
to dry.

TOOLS

Small saucepan/pot

Digital scale
(for grams)

Measuring spoon/cup
(for milliliters)

Wooden spoon or heat-safe
silicone spatula

Small bowl
(optional, for pre-mixing)

Baking paper or a non-stick mat
(for kneading and drying)

Airtight jar/container
(optional, for storing coffee
grounds)

Gloves
(optional, if you prefer less
sticky hands)

RECIPE

- 1 Measure and combine the liquids.
In a small saucepan, pour 15 ml water, 15 ml lemon juice, and 9 ml liquid honey.
- 2 Add the starch.
Sprinkle in 16 g starch. Immediately stir well with a spoon or spatula until smooth and lump-free.
(If it clumps, keep pressing and stirring—smoothness at this stage helps later.)
- 3 Heat gently.
Place the saucepan on the stove and warm on low heat. Stir continuously, scraping the bottom and sides.
- 4 Cook into a sticky paste.
After a few minutes, the mixture will turn glossy, thick, and sticky, pulling away from the sides like a soft dough. Keep it on low heat just until it holds together—don't overcook.
- 5 Add coffee grounds gradually (the binding step).
Remove from heat. While the paste is still warm, add dried coffee grounds little by little, stirring after each addition. Stop when the mass becomes cohesive and moldable, no longer sliding like syrup, but still soft and “slippery”.
- 6 Cool slightly, then knead.
Let it cool until safe to touch. Transfer onto baking paper and knead with your hands for a smoother clay.
→ If it's too sticky: knead in a bit more coffee grounds.
→ If it's crumbly or dry: add a few drops of water and knead again.

- 7 Sculpt and form.
Shape by hand, press into molds, roll, pinch, or build forms as desired. This clay works best for small objects, textures, and organic shapes.

DRYING

Natural air-drying: leave at room temperature for 2–3 days.

Faster option: place on a warm radiator (not hot enough to bake or crack the surface). Turn pieces occasionally for even drying.

Tip for cleaner results: Dry on baking paper and keep pieces spaced apart so air can circulate.

TEXTURE & CHARACTER

This first coffee mass is soft, smooth, and slightly slippery while warm—more like a sticky coffee dough than a firm clay. As coffee grounds are folded in, it becomes kneadable and sculptable, holding form while still allowing gentle smoothing and shaping. Once dried, it settles into a matte, earthy surface with visible coffee grain—an expressive, compostable-looking material suited to experimental design objects and tactile forms.

2. PAPER & COFFEE GROUNDS PULP CLAY (for sculpting, forming compostable objects)

INGREDIENTS

Part 1 — Paper pulp

13 g paper (toilet paper /
unused paper towel /
egg carton paper)

1 glass of water
(about 200–250 ml)

Part 2 — Flour paste (binder)

1 cup flour (about 150 g,
any type)

1 cup cold water

Part 3 — Final mix

Paper pulp (Part 1)

Flour paste (Part 2)

1 tbsp salt

2 tbsp oil (to reduce stickiness)

½ cup dried coffee grounds

TOOLS

Kitchen scale
(grams)

Measuring cup
(for a glass/cup of water)

Blender / food chopper
(for pulping paper)

Saucepan / pot

Whisk (best for preventing
lumps) + wooden spoon or
silicone spatula

Mixing bowl
(large)

Tablespoon

Baking paper / non-stick mat
(for kneading and drying)

Hair dryer
(for pre-drying)

Airtight container
(for fridge storage)

RECIPE

Part 1 — Make the paper pulp

- 1 Tear the paper into small pieces (this helps it break down faster).
- 2 Place paper into the blender/food chopper and add 1 glass of water.
- 3 Blend until you get a smooth, even pulp—like thick wet fiber porridge.
- 4 Pour the pulp into a bowl. (If it's extremely watery, you can gently squeeze out a little water, but keep it moist and workable.)

Part 2 — Cook the flour paste

- 1 In a saucepan, add 1 cup cold water first.
- 2 Add 1 cup (150 g) flour gradually, whisking as you go to avoid lumps.
- 3 Place on low heat and keep stirring continuously (scrape the bottom and edges).
- 4 Cook until it thickens to a mayonnaise-like consistency: glossy, smooth, and able to hold a soft mound.
- 5 Remove from heat and let it cool to warm/room temperature before mixing with the paper pulp.

Part 3 — Make the final clay mass

- 1 In a large bowl, combine:
Paper pulp (Part 1)
Flour paste (Part 2)
- 2 Add 1 tbsp salt and mix in fully.
- 3 Add 2 tbsp oil and mix again (this reduces tackiness and improves kneading).
- 4 Add ½ cup dried coffee grounds and stir until evenly distributed.
- 5 Knead the mixture by hand on baking paper until it becomes cohesive and sculptable.
→ If it feels too sticky: add a little more dried coffee grounds or a pinch of flour, knead again.
→ If it feels too dry/crumbly: add a small splash of water, knead again.

SHAPING & FORMING

Roll, press, pinch, or build forms in layers.

This mass is ideal for larger objects than pure coffee paste because the paper fibers add strength and structure.

Surfaces can be smoothed with slightly wet fingers or a damp spatula.

DRYING (PART 4)

- 1 After shaping, pre-dry with a hair dryer to “set” the surface and reduce deformation.
- 2 Then leave to air-dry for at least 2–3 days, depending on thickness.
- 3 Turn the object occasionally so it dries evenly.

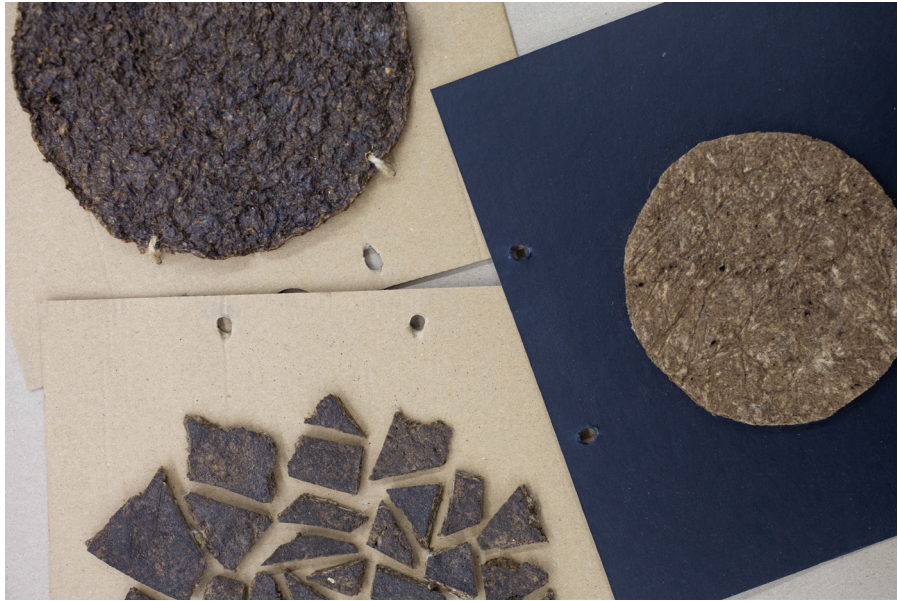
Drying note: Thicker pieces may take longer; slow drying reduces cracking.

STORAGE

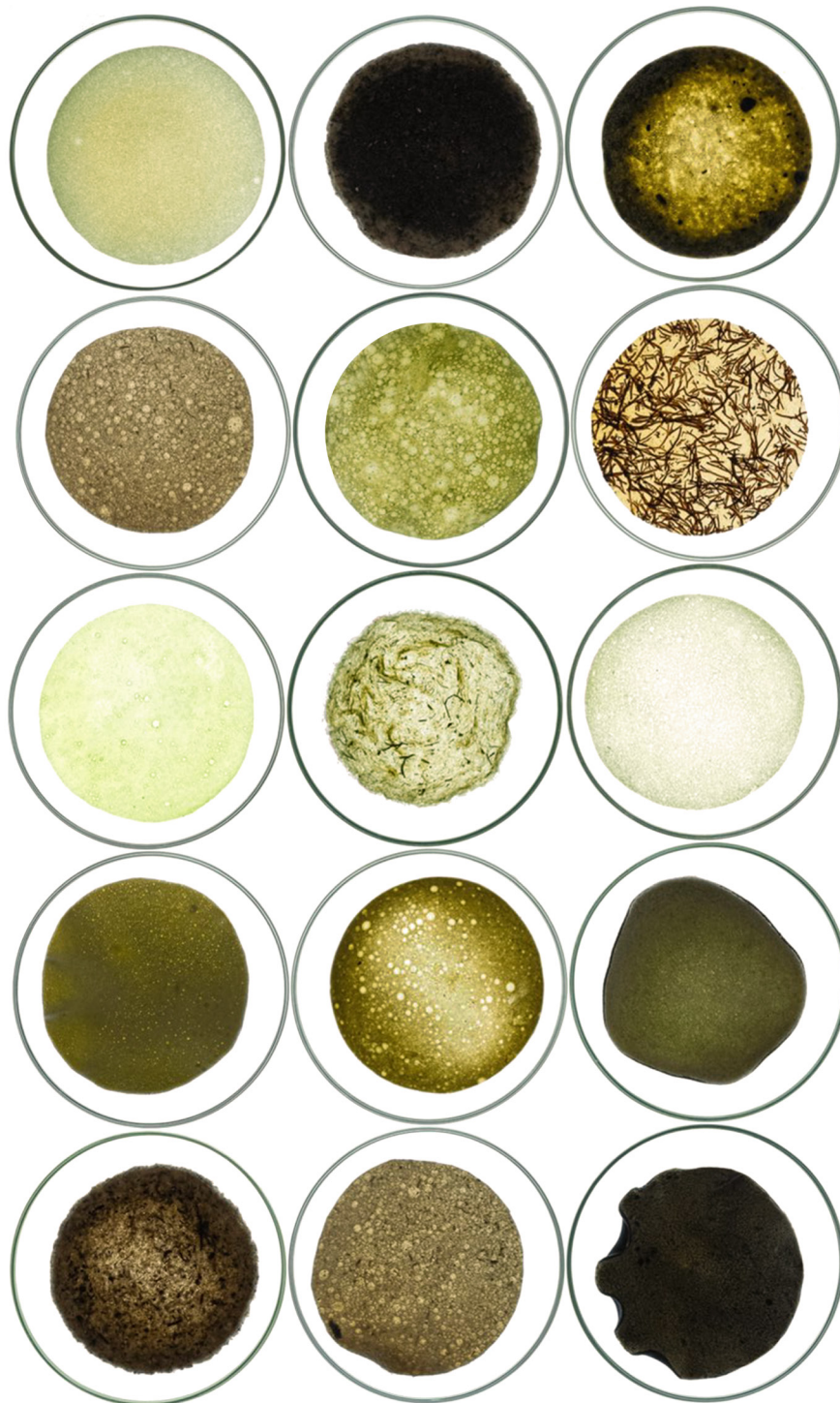
The fresh dough/clay can be stored in the refrigerator for up to 1 week in an airtight container to prevent drying out.

MATERIAL CHARACTER

This second recipe creates a fibrous, resilient clay from paper waste and coffee grounds, bound with a cooked flour paste. While wet, it feels like a soft pulp dough—less slippery than pure coffee paste, but stronger, more elastic, and easier to build with in thicker forms. As it dries, the paper fibers lock the structure in place, producing a lightweight, matte material with a natural grain and a subtle coffee-speckled surface—well suited to sculptural, compostable design prototypes and textured objects.







“BIOVIRSMAS” Indrė Spitrytė-Mikuckė

Creative biomaterials design workshop “Biovirsmas” with Indrė Spitrytė-Mikuckė. Indrė is a clothing and accessories designer, textile artist, lecturer in the Fashion Design study programme at Kaunas University of Applied Sciences, and a junior researcher at the New European Bauhaus (NEB) Research Centre of the Vilnius Academy of Arts. She is interested in the fields of sustainable fashion and textiles, as well as biomaterials, which she integrates into her creative processes. Experimental materials become her creative tool, helping her to address pressing issues of environmental pollution.

During this creative workshop, participants will be introduced to methods for developing more environmentally friendly biomaterials, using agricultural waste and other natural ingredients. Participants will create biomaterial samples and explore the properties and textures of these materials. This creative biomaterials design workshop will offer an opportunity to rethink the value of materials, their life cycle, and our relationship with the environment, while discovering new creative perspectives.



REPTILE MATERIAL

A gelatin-based biomaterial with intentionally formed air bubbles that create surface texture and visual depth. Spirulina powder and natural liquid soap are added to introduce natural coloration and stabilize air bubbles, producing organic patterning. Due to the high gelatin content, the resulting material is semi-transparent and relatively rigid, with limited flexibility once fully dry.

Difficulty: medium

INGREDIENTS

120 ml Water

1 g Glycerin

40 g Gelatin

3 ml Natural liquid soap

1 g Spirulina powder

TOOLS

stove / hotplate

measuring cup

cooking pot

scale

stirring spoon

straw

non-stick flat surface /
mold with raised edges

oven with fan (optional)

RECIPE

- 1 Measure all ingredients accurately.
- 2 Place the water, glycerin, and gelatin into a cooking pot and mix well before heating.
- 3 Heat the mixture over medium heat, stirring continuously, until the gelatin granules fully dissolve and the liquid becomes viscous.
- 4 Once the gelatin has fully dissolved, add the natural liquid soap and spirulina powder, stir gently to combine.
- 5 Continue heating until the mixture starts to boil, stirring constantly. When the mixture begins to froth, remove it from the heat.
- 6 Remove the cooking pot from the heat and pour the mixture into a non-stick mold or tray with raised edges.
- 7 While the liquid is still warm, use a straw to gently blow air into it, forming bubbles. Blow softly and steadily to control bubble size. Do not inhale through the straw, as this may draw the mixture upward.
- 8 Once satisfied with the texture, allow the material to dry completely in a well-ventilated area. Flip or rotate if drying unevenly.
 - Room temperature: allow to dry for approximately 4 days, depending on temperature and humidity levels.
 - To speed up the drying process, use an oven with a fan at 10–20 °C until fully dry.

Drying note: Avoid high temperatures during drying. Gelatin-based bioplastics are heat-sensitive and may soften or melt if exposed to elevated temperatures.

MATERIAL PROPERTIES

Transparency: semi-transparent.

Flexibility: low, becomes rigid when dry.

Surface: textured due to intentionally formed bubbles.

Color: natural green tones from spirulina powder, distribution may vary.

The material is sensitive to prolonged UV exposure, which may cause the green pigment to fade over time.

The material is sensitive to moisture and prolonged heat exposure, which may affect its stability over time.

GRIQA MATERIAL

A buckwheat hull-based biomaterial made with agar and glycerin. The mixture produces a non-transparent and relatively rigid material with medium flexibility once fully dry.

Difficulty: easy

INGREDIENTS

100 ml Water

4 g Glycerin

4 g Agar

10 g Buckwheat hulls
(ground)

TOOLS

stove / hotplate

measuring cup

cooking pot

coffee grinder

scale

stirring spoon

non-stick flat surface /
mold with raised edges

oven with fan or dehydrator
(optional)

RECIPE

1. Grind buckwheat hulls to a fine, sand-like consistency with a coffee grinder. Sieve if necessary to remove large particles.
2. Measure the water, glycerin, agar, ground buckwheat hulls.
3. Combine water and glycerin first. Disperse agar while stirring, then add ground buckwheat hulls.
4. Heat the mixture over medium heat, stirring continuously, until the liquid reaches a gentle boil and becomes viscous.
5. Remove the cooking pot from the heat and pour the mixture onto a non-stick mold or flat surface with raised edges.
6. Allow the material to dry completely in a well-ventilated area. Flip or rotate if drying unevenly.
→ Room temperature: allow to dry for approximately 4 days, depending on temperature and humidity levels.
→ To speed up the drying process, use a dehydrator or an oven with a fan at 30–40 °C until fully dry.

MATERIAL PROPERTIES

Transparency: opaque.

Flexibility: medium, relatively rigid when dry.

Surface: textured from buckwheat hulls.

Color: natural brown tones from buckwheat hulls, distribution may vary.

The material is sensitive to moisture and prolonged heat exposure, which may affect its stability over time.

LEATHER FROM THE SEA

An agar-based biomaterial in which natural liquid soap creates a leather-like surface texture during drying. Spirulina powder is added to introduce natural green coloration and organic patterning.

Difficulty: medium

INGREDIENTS	TOOLS
100 ml Water	stove / hotplate
5 g Glycerin	measuring cup
3 g Agar	cooking pot
6 ml Natural liquid soap	coffee grinder
2 g Spirulina powder	scale
	stirring spoon
	non-stick flat surface / mold with raised edges
	oven with fan or dehydrator (optional)

RECIPE

- 1 Measure all ingredients accurately.
- 2 Combine the water, glycerin and natural liquid soap in a cooking pot. Add the agar and spirulina powder and mix well before heating.
- 3 Heat the mixture over medium heat, stirring continuously, until the mixture begins to boil and foam.
- 4 Remove the cooking pot from the heat and pour the mixture onto a non-stick, flat surface or into a mold with raised edges.
- 5 Allow the material to dry completely in a well-ventilated area.
→ Room temperature: allow to dry for approximately 4 days, depending on temperature and humidity levels.
→ To speed up the drying process, use a dehydrator or an oven with a fan at 30–40 °C until fully dry.

MATERIAL PROPERTIES

Transparency: opaque.

Flexibility: flexible.

Surface: leather-like surface texture

Color: dark green.

The material is sensitive to prolonged UV exposure, which may cause the green pigment to fade over time.

The material is sensitive to moisture and prolonged heat exposure, which may affect its stability over time.

ORANGE PULSE

A gelatin-based biomaterial incorporating ground orange peels as a natural filler and pigment. The orange peels introduce warm coloration, subtle texture and organic patterning during drying.

Difficulty: easy

INGREDIENTS

100 ml Water

6 g Glycerin

6 g Gelatin

10 g Orange peels (ground)

TOOLS

stove / hotplate

measuring cup

cooking pot

coffee grinder

scale

stirring spoon

non-stick flat surface /
mold with raised edges

oven with fan (optional)

RECIPE

- 1 Grind the dried orange peels into a fine powder using a coffee grinder. Sieve if necessary to remove large particles.
- 2 Measure all ingredients accurately.
- 3 Place the water, glycerin and gelatin into a cooking pot and mix well before heating.
- 4 Heat the mixture over medium heat, stirring continuously, until the gelatin granules fully dissolve.
- 5 Once the gelatin has fully dissolved, add the ground orange peels and stir gently to combine.
- 6 Remove the cooking pot from the heat and pour the mixture into a non-stick mold or tray with raised edges.
- 7 Allow the material to dry completely in a well-ventilated area. Flip or rotate if drying unevenly.
→ Room temperature: allow to dry for approximately 4 days, depending on temperature and humidity levels.
→ To speed up the drying process, use an oven with a fan at 10–20 °C until fully dry.

Drying note: Avoid high temperatures during drying. Gelatin-based bioplastics are heat-sensitive and may soften or melt if exposed to elevated temperatures.

MATERIAL PROPERTIES

Transparency: semi-opaque.

Flexibility: flexible to semi-flexible.

Surface: slightly textured.

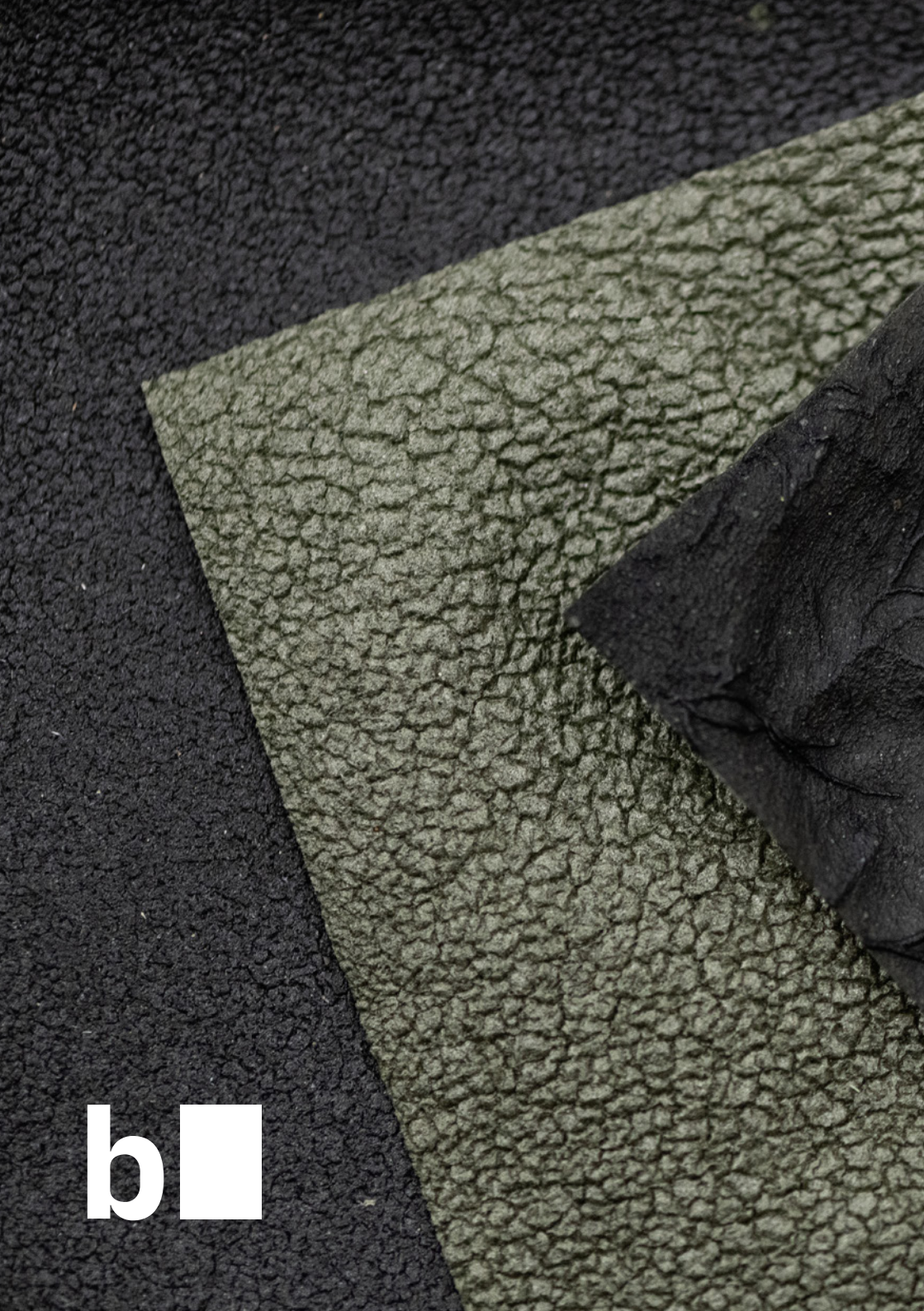
Color: orange with organic, naturally occurring color variations.

The material is sensitive to moisture and prolonged heat exposure, which may affect its stability over time.









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