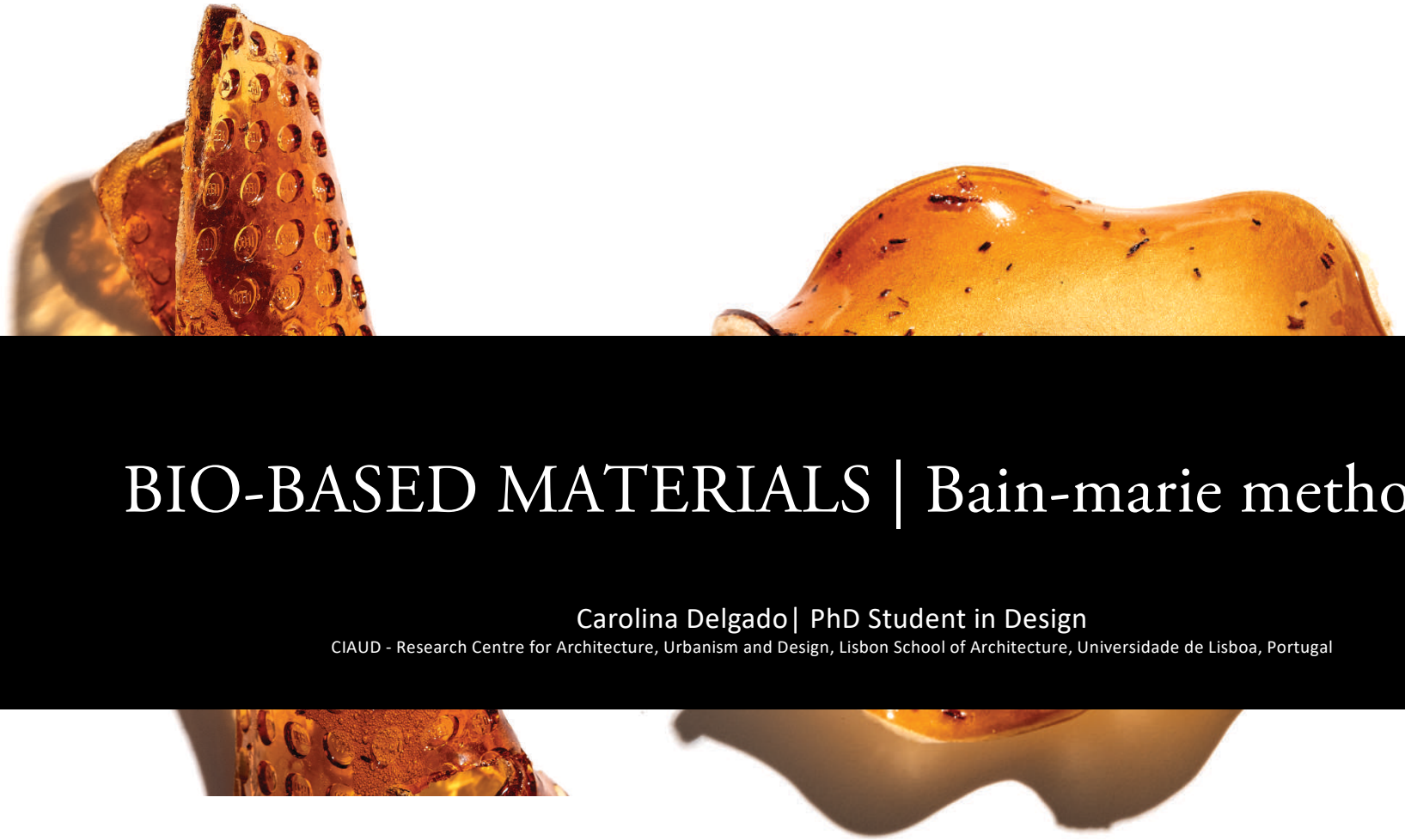


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BIO-BASED MATERIALS | Bain-marie method

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WORKSHOP PROTOCOLS

Seashells and Eggshells waste prep

Seashells

1. Collect seashells from kitchen waste, restaurants, or markets.
2. Wash the shells, then boil them for about 30 minutes at over 140ºC to kill any bacteria. You can also use an autoclave if available.
3. While boiling, use a skimmer or slotted spoon to remove any foam and dirt.
4. Dry the shells in an oven at 140ºC for 15 minutes. Repeat if needed until they are completely dry and brittle, but not burnt.
5. Place the shells in a bag and use a hammer to break them into smaller pieces. Then grind them with a mortar or a high-power grinder.

Eggshells

1. Gather eggshells from your home, neighbours, or even local restaurants.
2. Wash the eggshells, then boil them for about 30 minutes at over 140°C to kill any bacteria. You can also use an autoclave if you have one.
3. While boiling, use a skimmer or slotted spoon to remove any foam or dirt that appears.
4. Place the eggshells in the oven at 140°C for about 15 minutes. Repeat this step until they are completely dry and brittle, but not burnt. You'll know they're ready when you hear a slight crackle.
5. Grind the dried eggshells using a coffee grinder or a mortar and pestle.

Nuts and fruits waste prep

Any Nuts shells

1. Collect dry shells from nuts like cashews, hazelnuts, or others.
2. Put the shells in a bag and use a hammer to break them into smaller pieces. Then, grind them with a mortar and pestle or a strong grinder.

Used coffee grains

1. Collect used coffee grounds and keep them in a zippered bag in the freezer.
2. When you need them, take the grounds out of the bag and dry them in the oven at 100 degrees for 15 minutes. Repeat if needed until they are completely dry.

Fruit peels

1. Gather fruit peels from oranges, clementines, bananas, or other fruits. Remove any leftover fruit pulp, then place the peels in a zipper bag and refrigerate or freeze them.
2. Take off the white inner parts from the orange and banana peels, and remove any stems.
3. Toast the peels in the oven at 150 degrees for 30 minutes. They should be dry and brittle, but not burnt.
4. Grind the dried peels using a coffee grinder or a mortar and pestle.

Bain-marie

cooking method

also known as a water bath

60°C to 95°C



Prepare the bath:

1. Pour about two fingers of water into a pot and heat gently until steaming
2. Place a heatproof bowl (or goblet) on the the water
3. Stir slowly and continuously, cooking gently to avoid overheating or burning

Prepare the moulds

70% Alcohol > dry slower
96% Alcohol > is stronger



Disinfecting

1. Clean the moulds
2. Use Alcohol and dry (Air dry/ or demineralised water and paper towel)
3. Some moulds can be autoclaved or steamed in pressure cooker

Bio-composite

Gelatine and shells



- **40mL Water**
- **20g Gelatine**

- **100g Eggshells or cashew shells**

Eggshells

1. Measure all the ingredients. Choose and sanitize a mould.
2. Finely grind the eggshells
3. Mix water and gelatine in a glass beaker (lab goblet)
4. Cook in ***bain-marie*** – mid temperature (approx. 80ºC) for 10 min, keep stirring until you notice a change in texture
5. Add shells and mix it on heat till totally blended. (For colour mix food spices or terracotta).
6. Pour the mixture into the desired moulds

Bio-leather

Gelatine and fruit



- **50mL Water**
- **5g Glycerine**
- **10g Gelatine**

- **15 g Coffee grounds or orange or banana peels**
- **5mL Vinegar**

Coffee grounds

1. Measure the materials. Choose and sanitize a mould
2. On glass beaker (lab goblet) mix water with glycerine. After add the gelatine
3. Cook in ***bain-marie*** – medium temperature (approx. 80ºC) for 10 min, keep stirring until you notice a change in texture
4. Add coffee grounds (or fruit peels) and keep stirring
5. Add the vinegar and mix well
6. Pour the mixture into the desired moulds

Bio-foam

Gelatine and soap



- **120 ml Water**
- **6 g Glycerine**
- **24 g Gelatine**

- **5 ml Soap**

Dishwashing or hand soap

1. Measure the materials. Choose and sanitize a mould
2. Mix all liquid ingredients (without the soap), by order, together on glass beaker (lab goblet)
3. Cook in ***bain-marie*** – medium temperature (approx. 80ºC) for 10 min, keep stirring until you notice a change in texture.
4. Add food colour (or turmeric, paprika, or spirulina)
5. Turn of the heat and add soap and mix with a whisk
6. When is thickened like syrup gently pour the mixture into the desired moulds

Bio-plastic
Starch and colour



- **60mL Water**
- **5g Glycerine**
- **5g Corn starch or Potato starch**
- **5mL Vinegar**

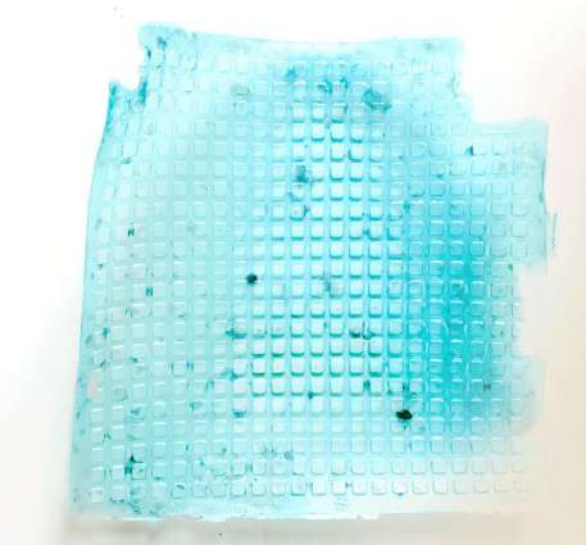
Starch

1. Measure the materials. Choose and sanitize a mould
2. Mix all liquid ingredients, by order, together on glass beaker (lab goblet) – (optional colour: hibiscus flowers)
3. Cook in ***bain-marie*** – low temperature (approx. 65ºC) for 5 min, keep stirring until you notice a change in texture.
4. Add a food colour and vinegar
5. Keep stirring until the mixture thickens
6. Pour the mixture into the desired moulds

Bio-foil

Agar and glycerine

- **250 mL Water**
- **15g Glycerine**
- **5g Agar**



Agar-agar

1. Measure the materials. Choose and sanitize a mould.
2. Mix all liquid ingredients, by order, together on glass beaker (lab goblet)
3. Cook in ***bain-marie*** – low temperature (approx. 80ºC) for 20 min.
4. Mix colour
5. Pour into the moulds

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Thank you!

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