# Plant and fungi paper making

Cellulose fibres of foraged or withered plants, as well as the chitin fibres of mushrooms can be transformed into paper-like and sculptural materials. This book features several recipes that will get you going. Be advised though that as is common for all bio-based materials, you will need to take the time to engage yourself in the process, the quality of your results will grow with practice and experimentation.

*Mould and deckle*
If you are new to paper making in general and want to get an overview of the process, have a look at Makezine: Paper Making 101, which also explains how to make your own mould and deckle, as does this tutorial by paperslurry. You can see which suits your needs.

*Preparation of fibres*
Whereas the process of using a mould and deckle to create the paper is the same in the plant paper making process, plant fibres need to be prepared for the process by boiling them in soda for at least an hour. This is needed to break down non-cellulose materials such as lignin, waxes, sugars, starches, and gums that can prevent the fibers from bonding well when forming sheets of paper. Mushrooms, especially the polypores often favoured for paper-making, need to be soaked for at least a couple of days or weeks to soften enough to be processed.

*Working with the recipes*
The recipes features here are not the only way to do it, but we chose them as a useful first step. There are different choices to be made at any step that will render other results, don't be afraid to experiment!

- Grass paper
- Flax pulp paper

# Grass paper

## Grass paper

*Recipe by Gabriella Timanti. This can result in a flat sheet of paper or molded in a 3D shape, as depicted below.*

**Tools:**

- Hot plate
- Cooking pot
- Spoon
- Flat surface
- Blender
- Rolling pin
- Drainer / strainer
- Large rectangular tub
- Mould and Deckle
- Cloths
- Some type of weight (heavy books do well)

**Ingredients:**

- Water 10 kg / L
- Grass 1 kg
- Soda ash 10 gr (washing soda, sodium carbonate $Na_2CO_3$)

**Method:**

1. Boil the grass (freshly cut or not) in water with soda ash for 1-2 hours. Stir occasionally.
2. Drain grass.
3. Beat the grass with a rolling pin/mallet hammer or similar until slightly pulpy.
4. Fill a large tub with water until about half full.
5. In your blender, put a bit of water and grass until it becomes a pulp. Empty into the tub after each go.
6. If you want, add petals or any other material you with to show on top of the grass paper.
7. Swish your hand through the water to make sure the fibres are evenly spread through the water.
8. Using the mould and deckle, whilst holding firmly, scoop up some pulp and hold horizontally until the water has drained through back into the tub.
9. Flip onto a cloth and peel the deckle off. Then place another cloth on top.
10. Repeat steps until you feel you cannot make anymore sheets.
11. Lay a heavy weight on top of the sheets for 20 minutes.
12. Then, remove the weight and place the paper sheets spaced out on a flat surface (or a mould if you want to achieve shape), so they can dry out.

# Flax pulp paper

# FLAX PULP PAPER

This recipe explains how you can make paper from flax residues. Also moldable as a 3D shape

SUPPLIES
Flax residues (fiber-rich, such as stems)
Water
Soda (e.g., washing soda)
Blender or immersion blender
Large pot
Mould and deckle (wooden frame with mesh)
Cloths or felt
Press (or two boards and straps)
Clothesline or drying rack

DIRECTIONS
1. Cut the flax residues into pieces of about 1 to 3 cm.
2. Place the pieces in a pot with water and add 10 grams of soda per liter of water.
3. Boil the flax residues for 30 to 60 minutes until soft and falling apart.
4. Rinse the boiled fibers thoroughly with water until all soda is removed and the rinse water is clear.
5. Blend the fibers in a blender or with an immersion blender until you get a fine pulp. Add enough water to make a slurry without large pieces.
6. Fill a large tub with water and add the pulp.
7. Use the mould and deckle to scoop a layer of pulp from the water.
8. Transfer the wet sheet onto a cloth or felt.
9. Stack the sheets between cloths and press them with a press or between two boards with straps to remove most of the water.

Let the sheets dry on the cloth on a clothesline or drying rack.

COLORING
If you want to add color to flax pulp during the papermaking process, the best moment is after the fibers have been cooked, rinsed, and pulped—so when you have a wet, blended pulp, but before you start forming sheets. At this stage, you simply mix your chosen dye thoroughly into the pulp and let it stand until the desired color is achieved. This method ensures even color distribution throughout the paper.

For natural plant fibers like flax, you can also add the dye to the fibers after rinsing and cook them together for deeper, more lasting color. Alternatively, you can dye finished sheets by dipping or brushing them with dye, but this gives a different, often less even, effect.

TIPS
Longer fibers make stronger paper. You can leave out the blending process for a rougher surface, mix flax pulp with longer flax fibres or with recycled paper pulp for different textures or strength. If you want, add petals or any other material to show on top of the flax paper.

SHAPING
This recipe also works as a 3D shape although it may take longer to dry as these shapes are often more difficult to press.

NO FLAX?
You can follow thos process with other plant materials as well, such as grasses, flower leaves and stems etc.