



# Friendly Fungi Growers

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## Research Questions

How can we diversify our domestic environments with fungus and mycomaterials in a symbiotic and mutual coexistence?

How could both species evolve and benefit from each other in a sustainable cycling process?

Is there a way to inspire people to not only integrate mushrooms in their urban environments, but to inspire them beyond in a way they could incorporate fungus in their own houses, and if so what would be the most accessible way to do so?

# Key words

Coffee bags  
User friendly  
Small installation  
and Prototypes  
Kit to grow  
Biomaterials  
Mycomaterials  
Substrat  
Sustainable materials  
Mycelium  
Air filtration  
Mico remediation  
Coffee Waste  
Domestic use

# Inspirations

As mentioned above, our discoveries in our previous research allowed us to target two projects from which we were particularly inspired by. The low-tech company

GroCycle, based in the United Kingdom inspired the main aspects of our project. Just as a refresh, this innovating local enterprise collects coffee waste in local cafes and restaurants by bike and cultivate mushrooms using this same waste as substrate. They also use suspended methods of production.



°The following pictures in this section were provided by GroCycle website : <https://grocycle.com/>

Jamie Pybus

household system  
for producing  
mushrooms  
also was  
observed for  
the matters of  
our prototype.

Indeed, we took the idea  
of making a kit for  
domestic use  
and imagined  
it based on  
GroCycle's  
suspension  
methods.



Pybus also uses coffee substrate in his system to grow the mushrooms on. This discovery reinforced our founded beliefs on coffee waste as main source of raw material for this project.



## Speculative

Well... its the fourth time you've left your house this week to go across the street to pick mushrooms... Your neighbor is starting to look at you weirdly and you too feel a little bit bad to still depend on this installation for your little dinners between roomates...

But the same time...the mushrooms are so good...

The evening is progressing and you start scrolling on your cell phone, when all of a sudden, an ad from a local mushroom company pops up on your feed. You laugh inwardly and tell yourself that the conversations you have with your roommates have been used appropriately this time to target you for this advertisement. By clicking on it, you realize that the company offers a kit, very «friendly user» to grow your own mushrooms at home! So cute, you think; with macramé and all...



For this project we have decided to develop a kit entirely made by DIY methods of crafting using both sustainable materials and recycled waste components. The idea consists on an easy to learn and friendly method of producing and harvesting fungus and mycomaterials in the comfort of home. We focused on suspended methods used by urban mushroom farms as a reference for the crafting of the kit.



Based on our discoveries made in the past project, we started by the most important aspect of the kit, the substrate. This one had to be easy to access, and found in considerable amounts for the project to be viable.

Coffee waste seemed to us to be the most suitable substrate for this project so we decided to push our use of this component at different states and to fully experiment with it. By realizing our project from recycled materials used for different purposes, we hope to inspire people to not only co-exist with the fungus and interact in a cycle that benefits both species but also to create and awaken their curiosity towards DIY and sustainable ways of crafting. We want to give them the tools and share this know-how.

## Project Description



After discussion, we wanted to be able to produce a project respecting a zero waste method of production at the best of our current capabilities. By using our raw material for multiple uses, we wanted to raise awareness on how waste can contribute to creative ways of sustainable resources. We also imagined our suspended bags made of organic and unprocessed materials such as the organic cotton samples we were provided at the beginning of the semester.

## Materials

Necessarily, to be able to hang our bags, we chose to use strings. We made several tests with different materials during our experiments considering resistance, quality, durability and aesthetics.

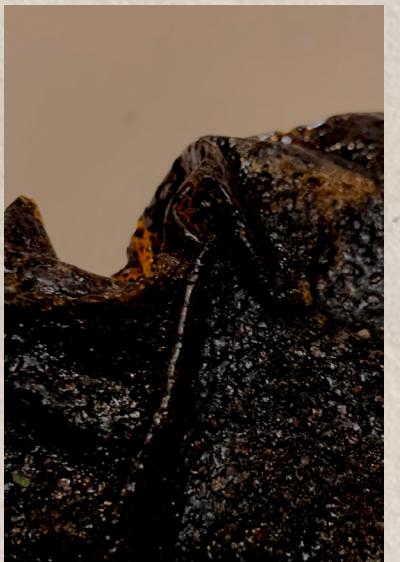
The result oriented us towards using organic cotton for the coffee bags and hemp, for the installation strings.



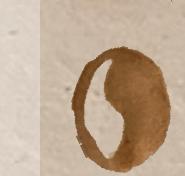
## Experimental Materials



### Bioplastic



While this was not used for the final project, we experimented with corn starch plastic and gelatine plastic. This material is made from biological components and is easily degradable while conserving some characteristics of plastic; thus it was considered as a potential bag-holder.



### Eggshell



While this was not used for the final project, we experimented with eggshells as a potential substitute for the fabric bags. Eggshell biomaterial is also biodegradable and our concept of waste-recycling goes well with collecting eggshell waste to turn it into potential material.



### Coffee Waste

Aside from using it as a dye, it was also used as a substrate for the mycelium to grow. The waste was collected regularly from our daily consumption.



### Onion Peels

The peels are collected then boiled to be transformed into an orange dye. The material is chosen for its color that matches our pre-planned color scheme.



### Kombucha

Scoby is cultivated at home. We dried the kombucha leather and turned it into an instruction bag that contains the mycelium for cultivation.



100% organic cotton for the coffee bags



40% cotton and 60% hemp organic strings

## Final Materials

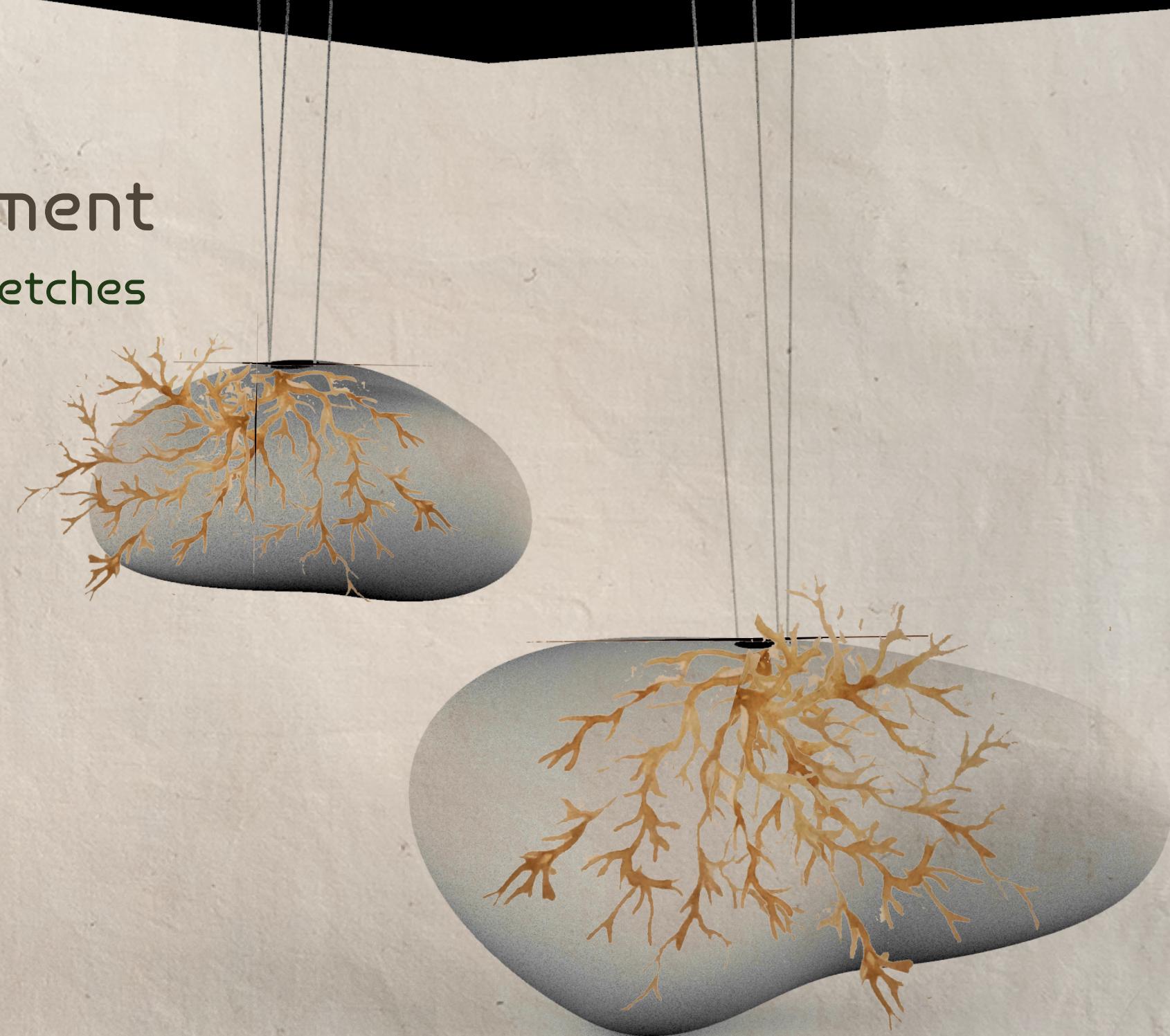


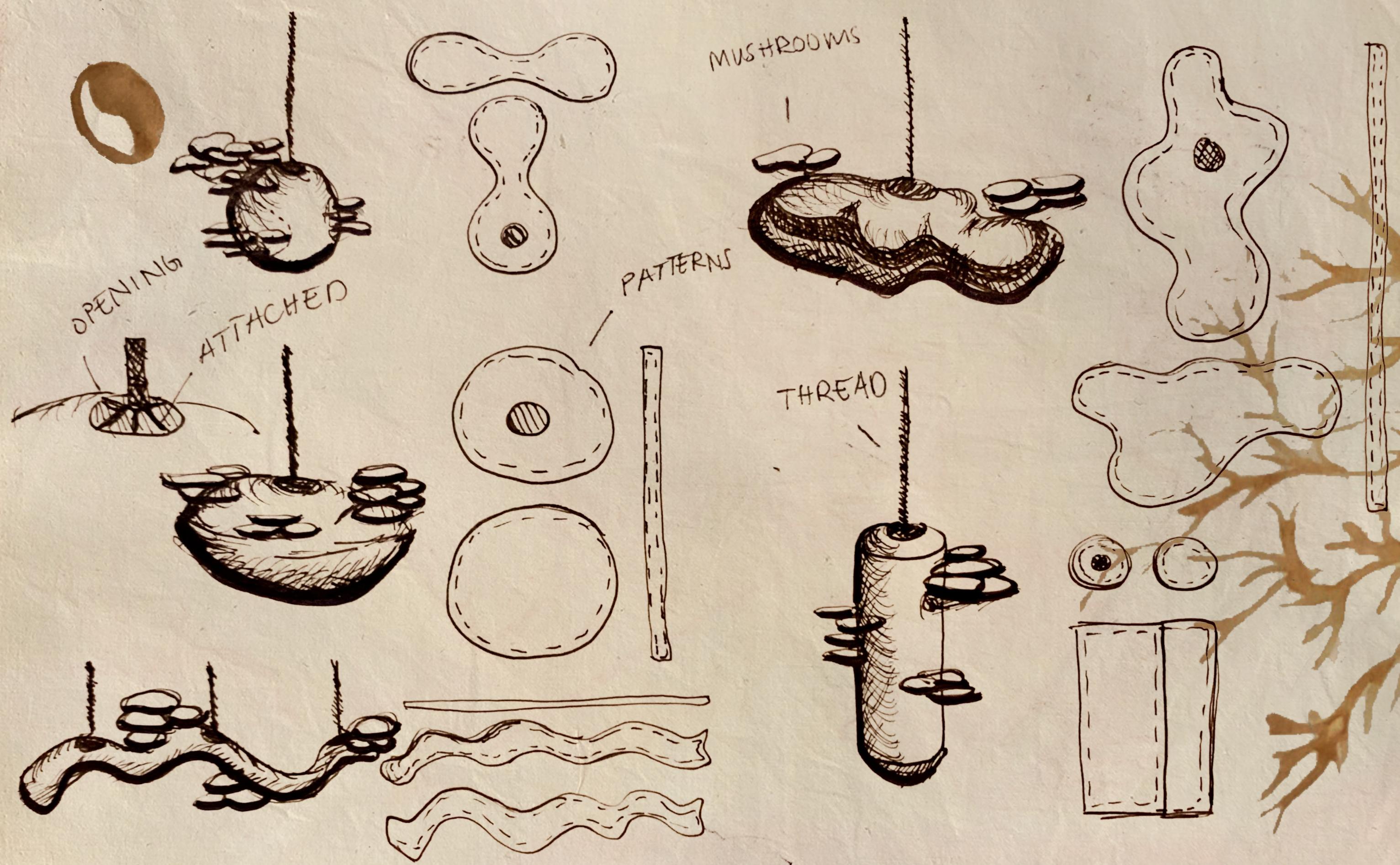
# Mock-Ups and Development

## Sketches

The concept shows suspended coffee bags with mycelium growing-out on the surfaces.

The bags have organic shapes; the openings were meant to look like draw string bags.







#1

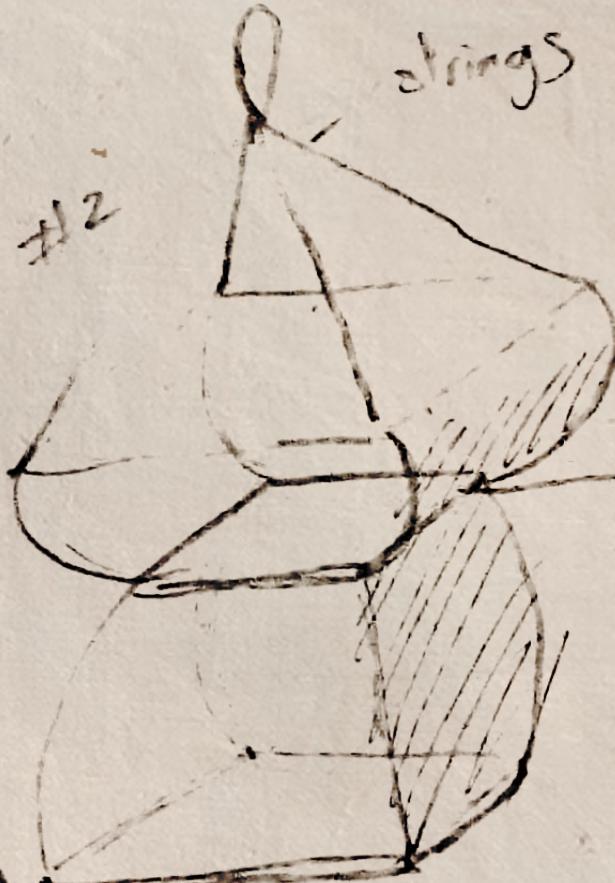


strings

Suggested way  
to attach bags  
and strings



#2

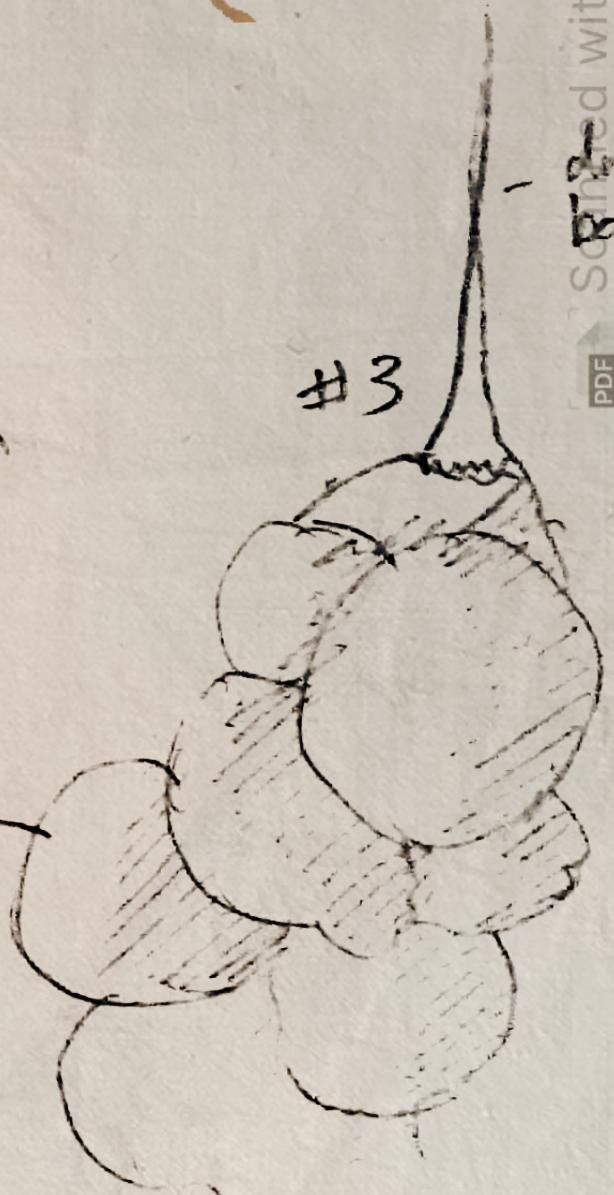


strings

Cardboard  
Support  
to hold on  
shapes.

— will close opening  
of the bags with  
weight and gravity  
applied.

Multiple  
Bags sewn  
together



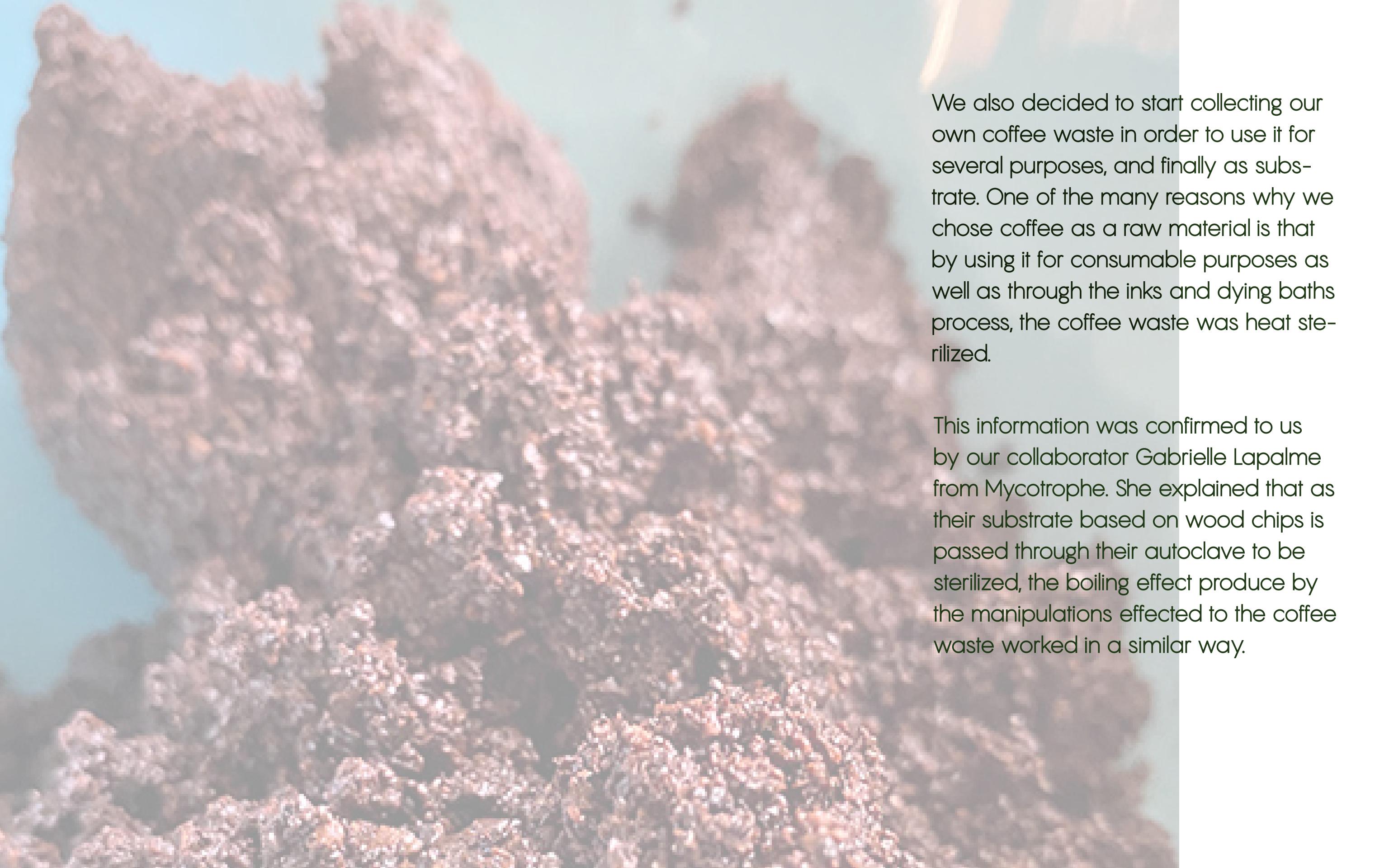
#3

Indeed, from the first weeks of the session, we had reserved at least one of our tests (Man's and Juan's) with kombucha leather that we were growing in another class. As it is fungi based, we thought it was completely relevant to experiment with.

For this project to work we had to plan a few steps that we needed to start as early as possible in our process in order to make it achievable.



**Asynchronous  
Objcetives**

A large, irregular pile of brown, granular coffee waste material, possibly chipped coffee beans or grounds, filling the left side of the frame. It has a textured, somewhat moist appearance.

We also decided to start collecting our own coffee waste in order to use it for several purposes, and finally as substrate. One of the many reasons why we chose coffee as a raw material is that by using it for consumable purposes as well as through the inks and dying baths process, the coffee waste was heat sterilized.

This information was confirmed to us by our collaborator Gabrielle Lapalme from Mycotrophe. She explained that as their substrate based on wood chips is passed through their autoclave to be sterilized, the boiling effect produced by the manipulations effected to the coffee waste worked in a similar way.



Now that we have learned through our workshops different ways of using and reusing food waste, we have decided to apply these lessons in our project as well. We decided to collect food scraps from onions, avocados and some other components from our field trips to use them as part of our creative process



Bioplastic experiments

Experiment with bioplastic as a bag-holder. This one plastic was too hard and easy to tear off. Since it does not have the malleability of a string the idea was abandoned.

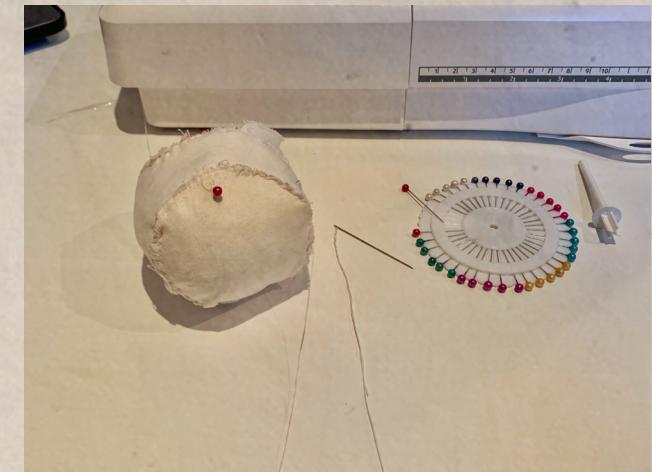
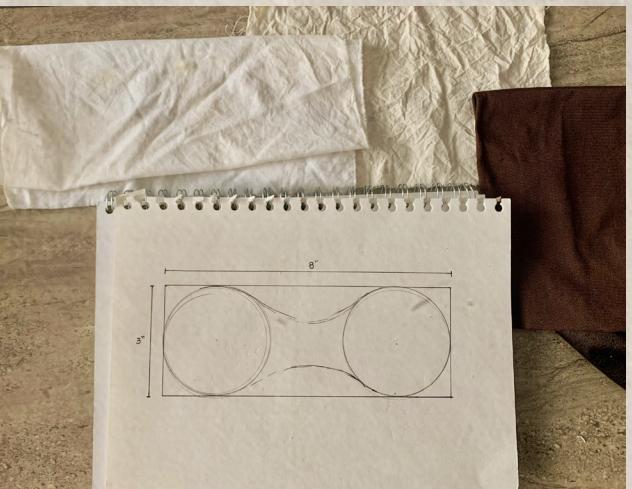


**Eggshell experiments**

Experiments with eggshell as a substitute for the bag.

The idea was dropped due to a big quantity of shells needed in order to produce one container.





## Bag's shape and patterns

We decided to explore more rounded and organic shapes as Karolyn recommended us, considering the fact that our bags would be filled with coffee.

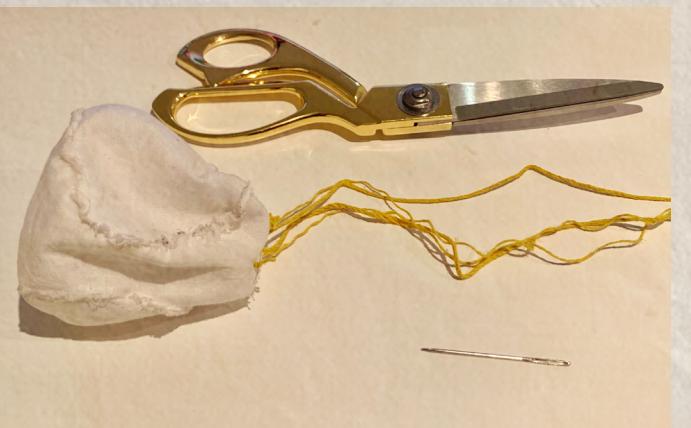
The bags took inspiration at first from some simple patterns observed on baseball and football templates.

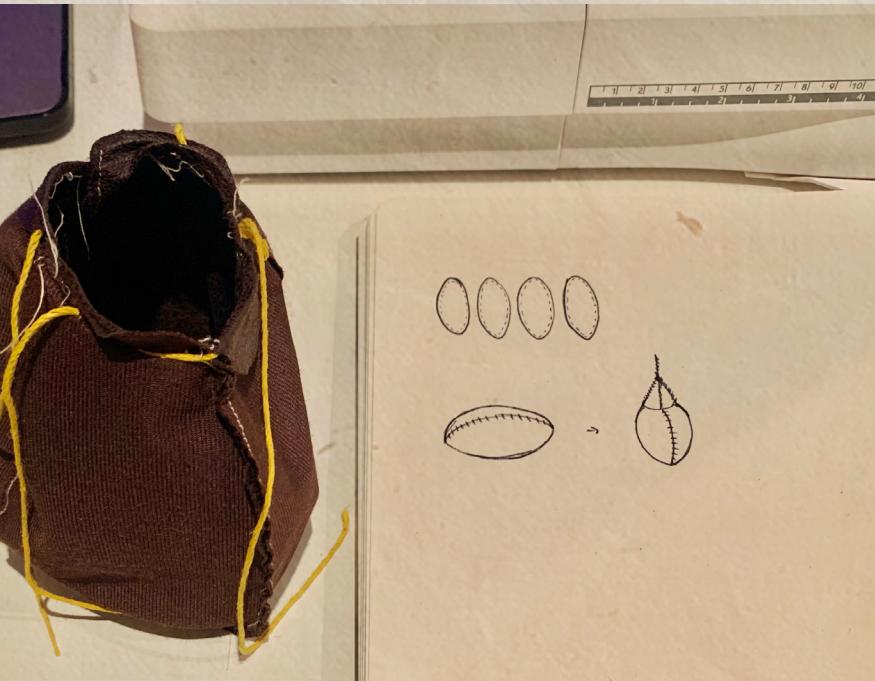
As they were difficult to sew with the machine for our unexperimented team we decided to do it by hand. The shape that resulted gave us an idea of how the bags could be envisioned.



## Mock-ups

As we consider only the shape of the bag in this exercise, we improvised how we could suspend this one with some simple thread attached to the opening of the bag. We were also able to consider the weight of the bags as we filled them with humid coffee waste.





Now that we had a better idea of how our project could be imagined, we decided to further explore the pattern shapes that we could create.





## Macrame confection

The idea of macrame came after we realized we would be limited in size for our bags, as these ones became really heavy once filled with coffee. We thought about a solution involving the threads themselves.



The knots not only solidify the threads, but also, depending on the shape, allow the weight of its contents to be distributed over more than one pressure point; as opposed to our first imagined bags.



Another reason why we chose macrame is our lack of experience with the sewing machine. However, I had the chance to learn how to make bracelets with my friends from summer camp a long time ago. I revisited the basics and developed different types of knots and their arrangements. Very quickly I was able to easily mix, double and tie knots to create our own macrame patterns. I explored fluid and rounded shapes to match with our bags. Shapes like «s» «o» and more were explored in different sorts of knots..



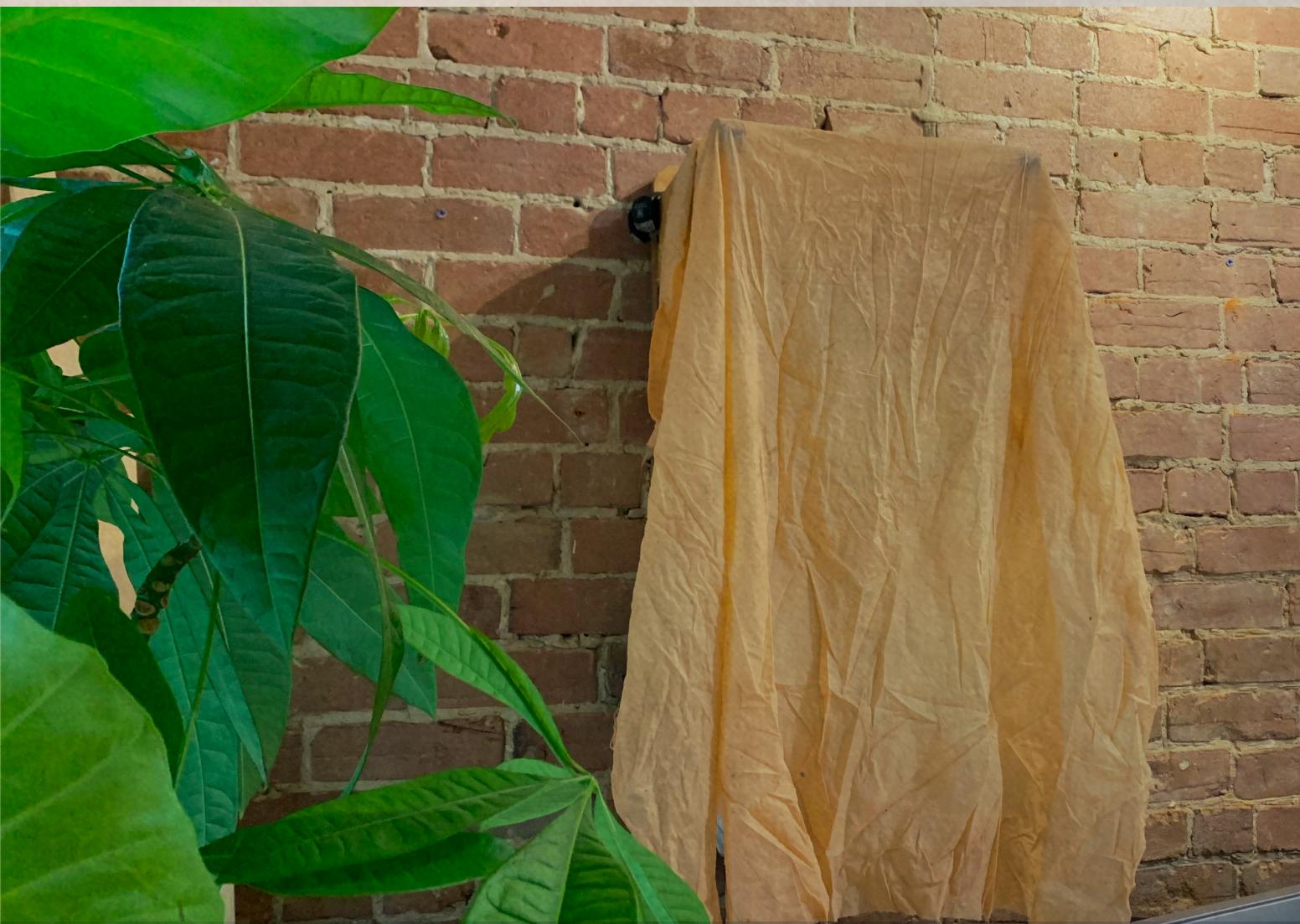
## DIY Manipulations



We were introduced this session to workshops showing us the principles of natural dyes. We decided to apply these for our project focusing specifically on coffee and onion dyes. As our goal was to recycle, we decided to use some of the fabrics we had experimented our dyes with across the session.



In order to make our bags permeable we decided to apply beeswax. This would prevent the humid coffee to flow out



It is not only our pieces of fabric that have undergone preparatory manipulations. Indeed, our threads also had to go through the mordanting process as much as the dye baths themselves. At this stage, it was important to handle meticulously every thread since mixing them could cost you too, many hours of pure pleasure...

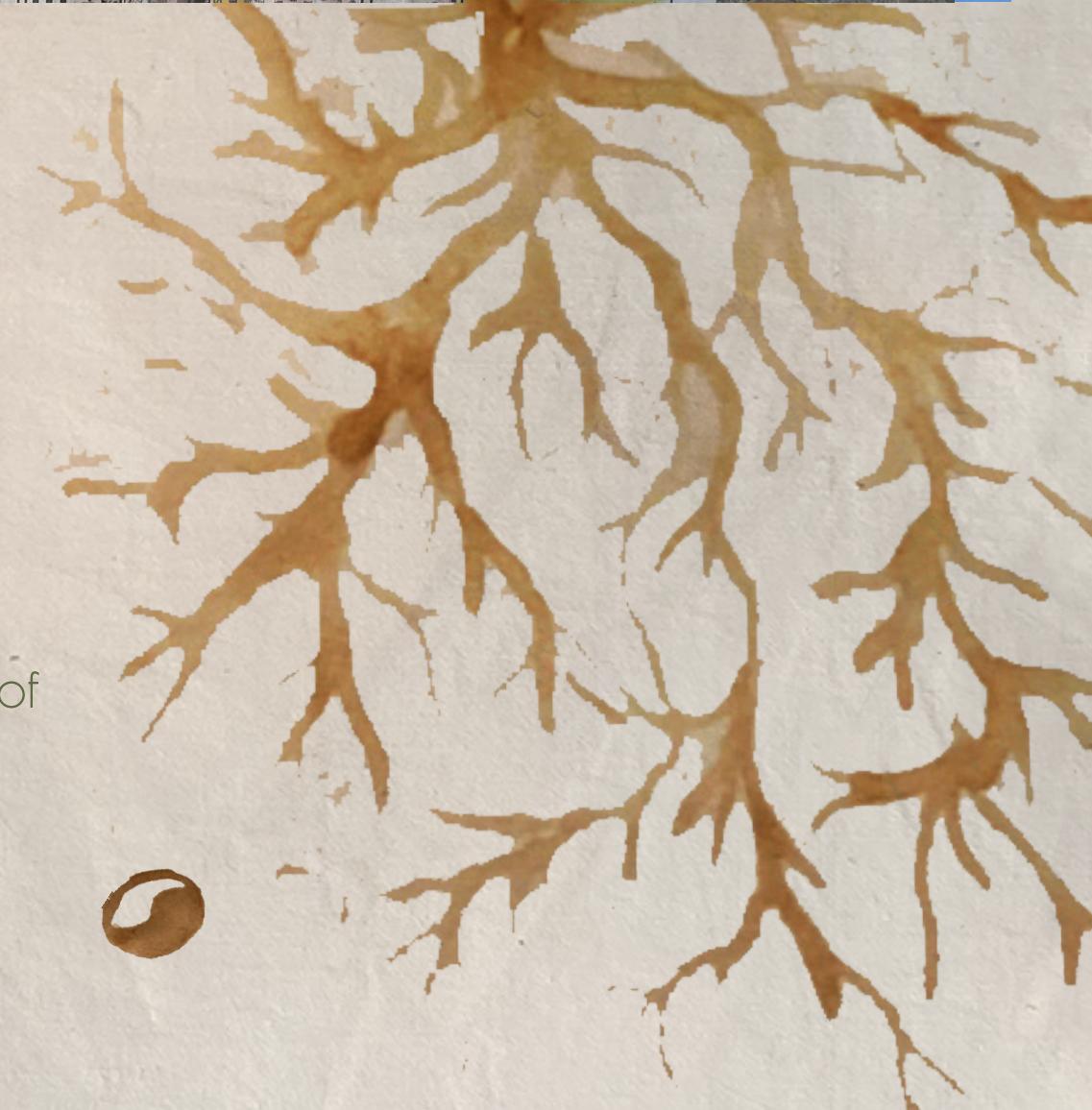






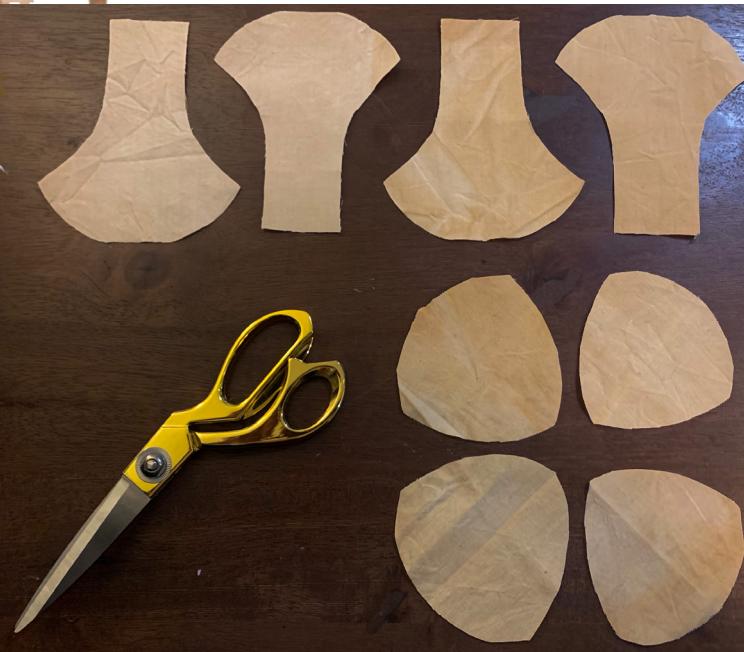
## Kombucha Manipulations

After drying our fungi based matter, we obtained this leather-like piece of material. this one could be dyed as well as sewn as the other pieces of our project.



## Sewing

We unconsciously left the sewing part for the end probably because we have not experimented with sewing. Indeed for this part, we had the chance to be guided by Pk during a zoom session and by mail. While discussing our concept and following our ideas about organic shapes for our bags, we established to work with mushroom-shaped bags. The simplified basic patterns were very kindly shared with us by Pk so that we could start making some iterations.





We've been able to design different shapes and sizes of mushroom bags. We combined our fabrics to create stronger contrasts between the trunk and the head of the mushroom.

## Branding

The logo illustrates coffee beans as an emblem of coffee grounds and how this substrate helps thrive mycelium and mushroom fruits.

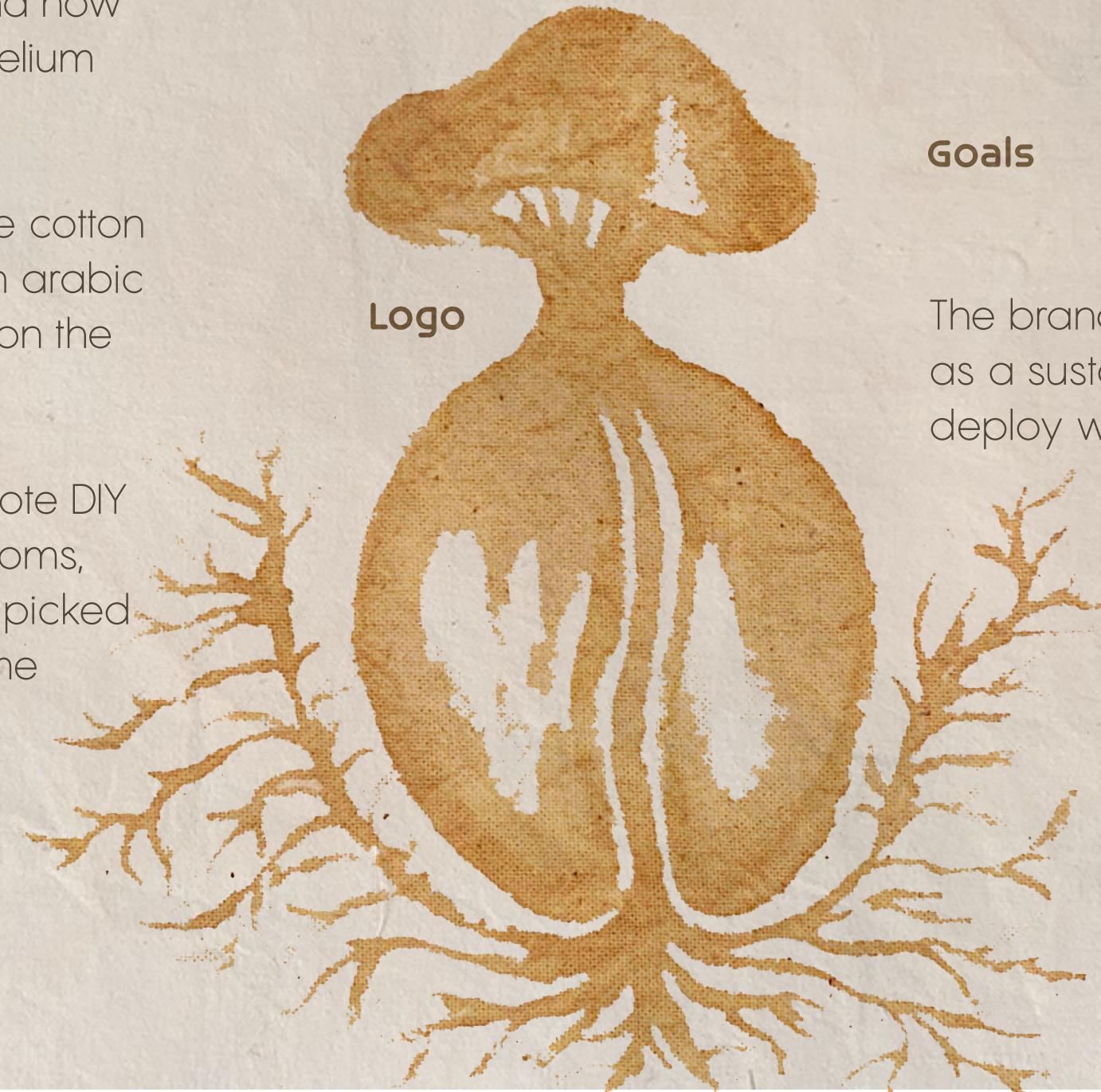
The logo is hand-drawn on the cotton fabric with coffee ink and gum arabic to show how it will be printed on the coffee bags.

As the brand and the kit promote DIY manners of cultivating mushrooms, hand-drawn illustrations were picked to make the brand image home and domestic friendly use.

Logo

Goals

The brand promotes DIY mushroom growing as a sustainable economic lifestyle, a way to deploy waste to thrive edible mushrooms.



# Final Product

## Coffee bags



What's inside?







Installation Ideas

# Waste/Unsustainable methods

## Waste Analysis

While the entire project was glue-free and compostable, some inevitable factors of unsustainability remain. We are not guaranteed that the cultivation protocol can be used for its life span, as observed with most product treatment nowadays, most of them are thrown before breaking. We tried to overcome this issue by using mostly waste materials so the production of it causes its minimal impact. Another factor is the treatment of the product once thrown away: the recycling and composting system is still not perfectly reliable. It happens often that the recyclable materials are not sent to where they should be and are not correctly treated. Finally, the last factor comes with the production of the used materials before purchase, we are unsure how the fabric has been treated and whether in a sustainable way. But if only looking for the project itself, it is sustainable since it can return to the ecosystem and be composted.

# Sustainability, Socio-cultural Analysis

## Sustainability



### Boiled Onion Peel

After it has been boiled for the dye, the remaining peels are put into the cultivation bag as a compost for mycelium growth.



### Coffee Waste

After being treated to make the dye, the remaining waste is put into the cultivation bag as compost for mycelium growth.

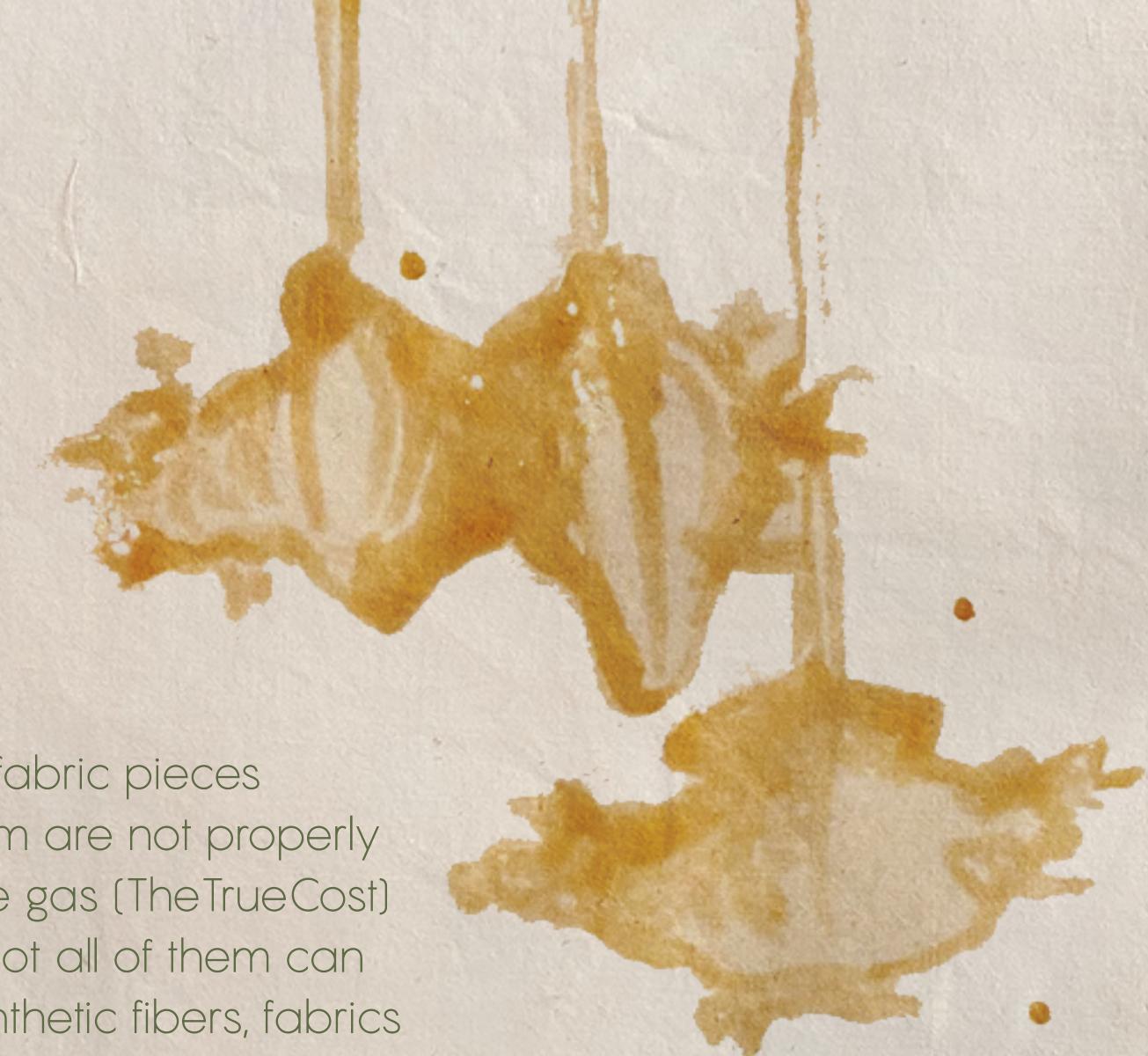


### The Liquid for Kombucha

Since we waited around four weeks to grow the leather, most of the nutrition liquid was absorbed and little was left. We poured the remaining liquid into the soil so it can still nourish the bacterias and the soil.

## Composting used coffee bags

Among the 80 billion new pieces of clothing and fabric pieces bought every year on a global basis, 90% of them are not properly recycled and end in landfills to generate methane gas (The True Cost). An alternative to this is composting fabric. While not all of them can be composted due to harmful dye or special synthetic fibers, fabrics based on fibers such as cotton, silk, wool, cashmere, hemp, bamboo and linen can be biodegraded. ("1millionwomen") Some companies have come with a few directly eco-friendly fabric that can go directly into the recycling bin of the backyard, one of them is the company Freitag with its biodegradable F-abric. ("Buschsystem")



## How to Compost Coffee bags



1

Shred

Get the size down, you can cut things into little squares or just rip them into strands. They'll break down quicker, and you can scatter the pieces evenly.

2

Remove anything not biodegrade

This includes any plastics such as price/brand tags, metals such as buttons and zippers...

3

Use a hot compost for faster results

This is optional but hot composting can break down matter within 18 days.

4

Add worm to the compost if possible,

Worms produce some of the best fertilizer on the planet and are super-efficient at processing organic waste.

5

Wait

After a period depending on the type of fabric, your compost will be ready.

(1millionwomen.com, 2016)



## Reflections



In this online project of its first kind, we are particularly pleased with our work. With everyone's help and skillset, we were able to envision our project and faithfully fulfill our mandate. Although we are aware that our kit will probably not produce the desired results, the idea seems viable if transposed into a much more professional context where research, experimentation, and testing would have been conducted to ensure its proper functioning. Indeed, as Gabrielle repeats to us, producing mushrooms is not an easy task, countless parameters must be controlled and regulated at all times. It's a lot of work, but in spite of everything, our collaborator seemed very enthusiastic when we shared our final product with her. Indeed, we were able to discuss with her similar methods used in the industry, especially for bags filled with substrate and colonized by mycelium. Gabrielle shared with us that the idea of using organic cotton as raw material for our substrate bags was a much more ecological alternative to traditional plastic bags.

We, therefore, lingered on this aspect in particular while trying to take into account as many parameters of regulation of the ambient environment as possible during the preparation of our project. With the help of pk we have developed our initial idea of making bags with organic shapes to concretize them in the shape of mushrooms themselves.

In this case, we are very satisfied with our use of our raw material coffee since it has gone through 4 states of boiling, first for our personal consumption, secondly for the ink from which we developed our logo, then we made

dye baths with from that same ground waste, and then inserted it in our bags as a substrate. By these manipulations, we made sure to sterilize our substrate several times, which is essential to the plausibility of our project.

A few aspects still need to be more widely explored, including the ideal location for our project to be suspended. In particular, we have reflected on this aspect by transposing it to the source of its form and visual aspect. In order for our speculative clients to become acquainted with our product, we thought that a familiar look had to be taken into account to create a feeling of trust and confidence in the product. This kitsch implement would not only help our product be recognizable to a large audience but would also implies that its use is accessible and simple.

Finally, given the current circumstances, we are very pleased to have learned during this process methods that are as much related to sustainable ways of crafting but also to have been able to practice skills sets and learnings from our workshops to incorporate them into our work... We mean... aren't the mushrooms cute ?



## Wrap-Up info Collaborators

Again we would like to thank Gabrielle Lapalme from Mycotrophe for her time and her advices on the process of this project. She encouraged our ideas and provided us with tips and reflections that were fundamental for our projet to be achievable.

We would also like to thank Karolyn for her advice on our pattern shapes and her recommendations concerning the strength of our suspended bags.

Finally, we greatly thank pk for imagining the pattern shapes that we used for this project. Her time and instructions provided us with the tools to complete this project.

## Project 2: Human/plant/animal: co.production

Names of collaborators:

Tasks&Events	Responsible per	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1	2
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### Kick off

Research	all
Illustrations	Reihaneh
	Man
Graphics, type design	Reihaneh
	Juan
Production	all
Calender	Reihaneh

Calendar

### Research:

First brainstorm meeting	all
Zoom meeting: Share explorations, id	all
Search and share	all
Search and share	Juan
	Reihaneh
	Man

### Proposal:

proposal meeting	all
write adjusted proposal	all
Proposal branding	Man
proposal PDF compilation	Juan
Proposal Due	all

### Production:

coffee bag sketches	all
buy materials	Man
	Juan
	Reihaneh
Email Karolyn for sewing machines	Juan
Work on Coffee bag Rhino model	Reihaneh
	Man



# colophon

## Omnium

Phil's Fonts Studio  
Sandy Spring, USA

For adding legibility to the headings, we changed the typeface to Omnim. This typeface brings a chunkier stroke thicknesses which makes it easier to read the headings. The aesthetic are almost the same as the last one in terms of curviness of the types.

## PANGRAM SANS

Mathieu Desjardin  
Pangram Pangram  
Montreal, Quebec

This typeface designed by Montreal designer Mathieu Desjardin reflects his desire of function simplicity and form. As we based our project on these same attributes, we decided to include this open source local typeface to give legibility and simplicity to our content. The simple shapes and empty space of Mathieu's work agence itself to the creation Ominium used for our new headlines.



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