



@JohannesPlenio


Protective, high quality, elegant packaging  
that is also good for our planet  
**is possible**



Let's  
meet,  
I'm  
mycelium



I'm the root  
structure  
of mushrooms



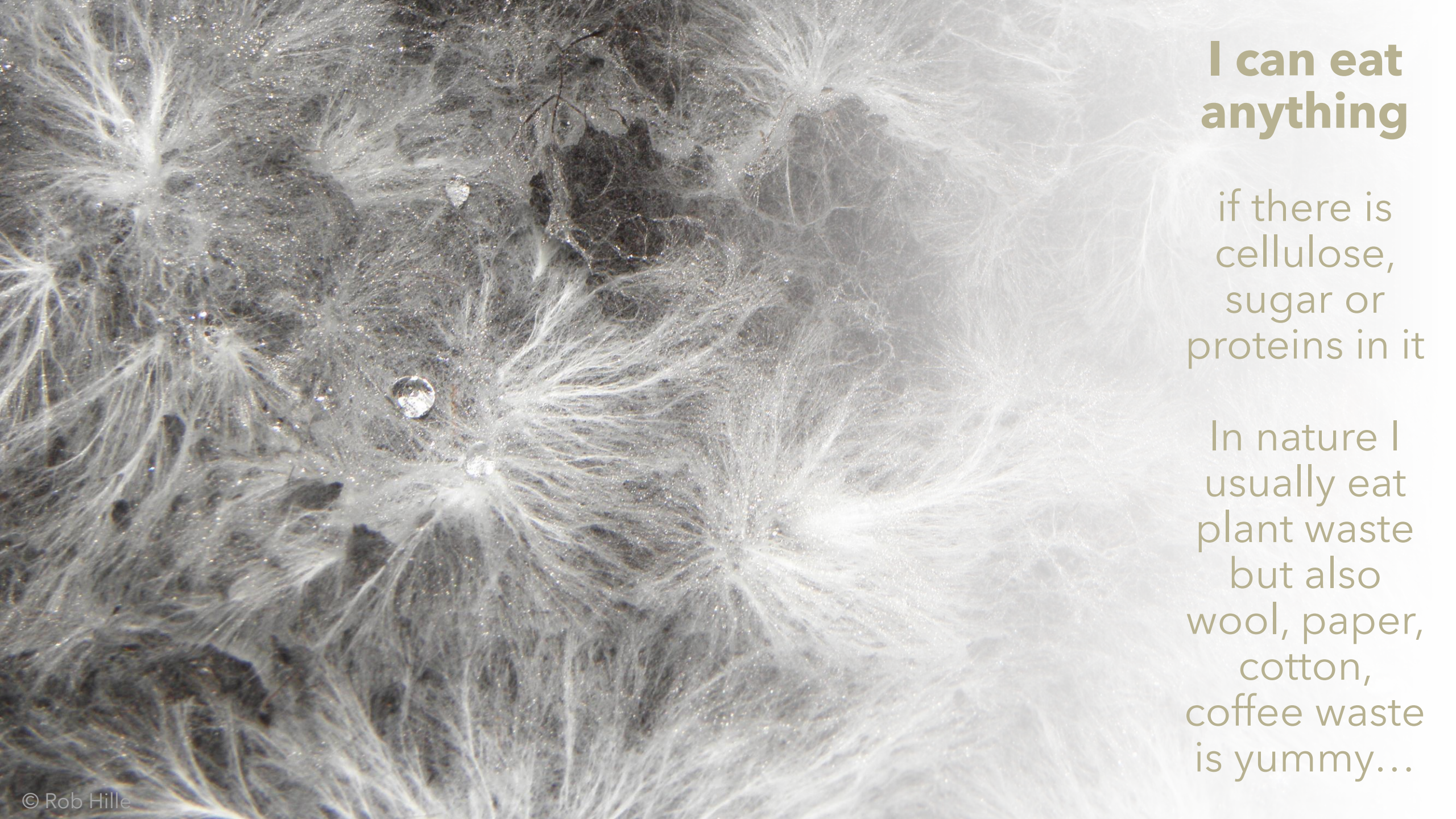
**I'm the  
network  
of the  
natural  
world**

carrying  
information  
and nutrition  
between  
plants and  
trees



**I'm  
the one  
cleaning  
the world**

by  
eating the  
organic  
waste,  
I am the  
greatest  
recycler



## I can eat anything


if there is cellulose, sugar or proteins in it

In nature I usually eat plant waste but also wool, paper, cotton, coffee waste is yummy...

# I'm a natural binder

by  
growing  
while  
eating the  
organic  
waste,  
I bind  
everything  
else



A photograph of a forest floor at night or in low light. On the left, a tree trunk is covered in bright green moss. In the foreground, several mushrooms with light-colored caps and stems are scattered across a bed of moss and small plants. The background is dark, suggesting a dense forest.

I've been around for  
millions of years  
*but*  
I've recently been  
**rediscovered for  
new purposes**



**I'm The Revolution in Packaging**  
you've been waiting for



**Mushroom<sup>®</sup> Packaging**





I am **carbon negative** &  
**100% home compostable**





# I'm also

insulating (sound and temperature)

shock absorbent

water-resistant

fire retardant

protective

robust

light

*And I'm as sustainable as a packaging gets these days 😊*





Yes,  
I am here  
to replace  
Styrofoam™

*(did you know that even surf boards  
can be made from me?)*





Styrofoam companies tell you their material is **100% recyclable**, uses **little energy to manufacture** and **creates little pollution**.

**100% recyclable**



Only if it can be brought to the special EPS recycling centers otherwise takes more than 500 years to decompose

**Uses little energy**



EPS is made from petroleum, you know what that means, right?

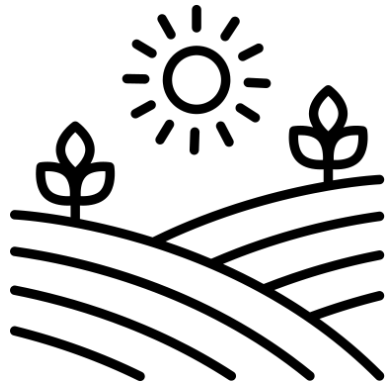
**Creates little pollution**



Styrofoam easily disintegrates into little beads upon any physical force and pollutes all our fresh water and lands with those little plastic beads!

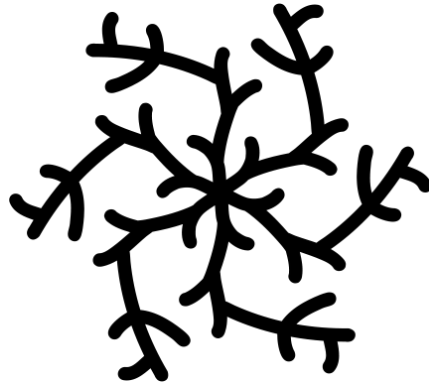


Here are the ingredients of the **revolution**



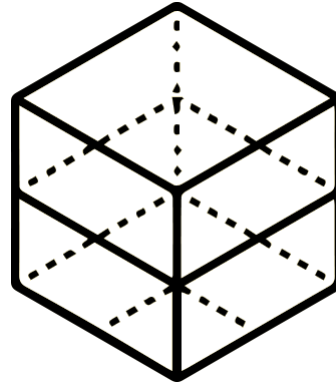
**Upcycling  
Organic  
Waste**

+



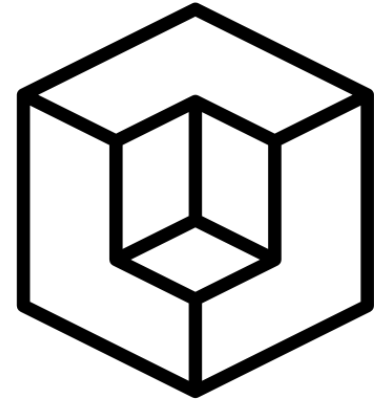
**Mycelium**

+



**Design**

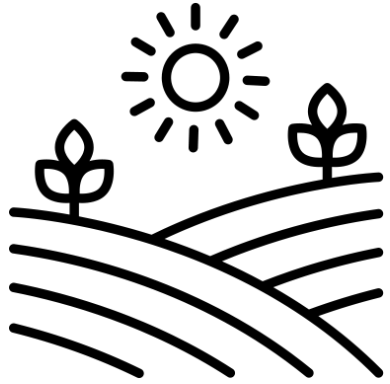
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**Mushroom<sup>®</sup>  
Packaging**



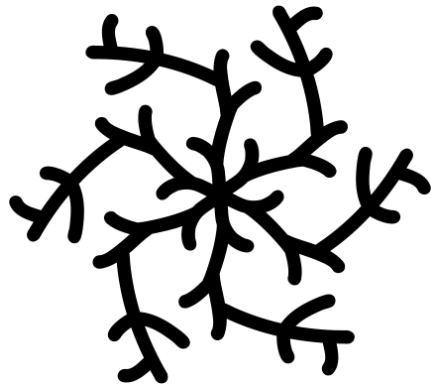
# Mushroom<sup>®</sup> Packaging uses **nature's intelligence**



## Upcycling waste

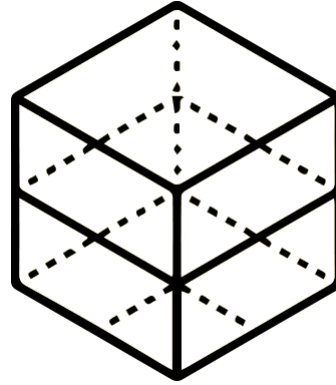
Working with regional farmers, we start with natural crop fibres no longer of use, such as hemp.

The material is carefully prepared, ready to be introduced to our mycelium



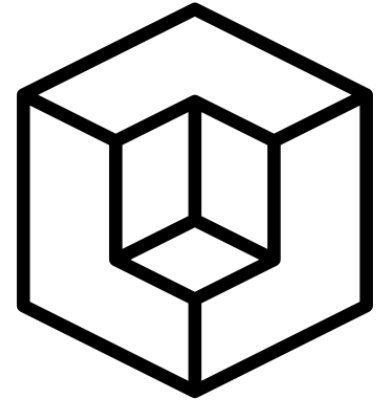
## Mycelium

The natural growth process of mycelium creates a web of thread-like filaments (hyphae), which can be grown into virtually any shape or form to create infinite variations of packaging



## Design

Our design team work alongside you for the exact requirements for your packaging. Through rapid prototyping and product testing, we ensure alignment, durability, and quality assurance.



## Mushroom<sup>®</sup> Packaging

The resulting product is an organic alternative to petroleum-based polymers. MycoComposite™ is a high performing material, with the best carbon footprint, and is 100% home compostable.



# Mushroom<sup>®</sup> Packaging takes **7 days to grow**



## **1- Ingredients**

Only mycelium and agricultural waste are mixed to prepare the substrate



## **2- Fill the mould**

The substrate is filled in a mould and left aside to let the mycelium feed on the waste, grow and bind the mass together



## **3- Let it Grow**

With mycelium working its magic inside the moulds, your packaging is ready in 7 days!



# Mushroom<sup>®</sup> Packaging can be in **any shape**

As long as we can make a mould for it to grow...







# Mushroom<sup>®</sup> Packaging is **carbon negative**

We use local agricultural waste, removing the otherwise waste that goes to landfill and emits methane.

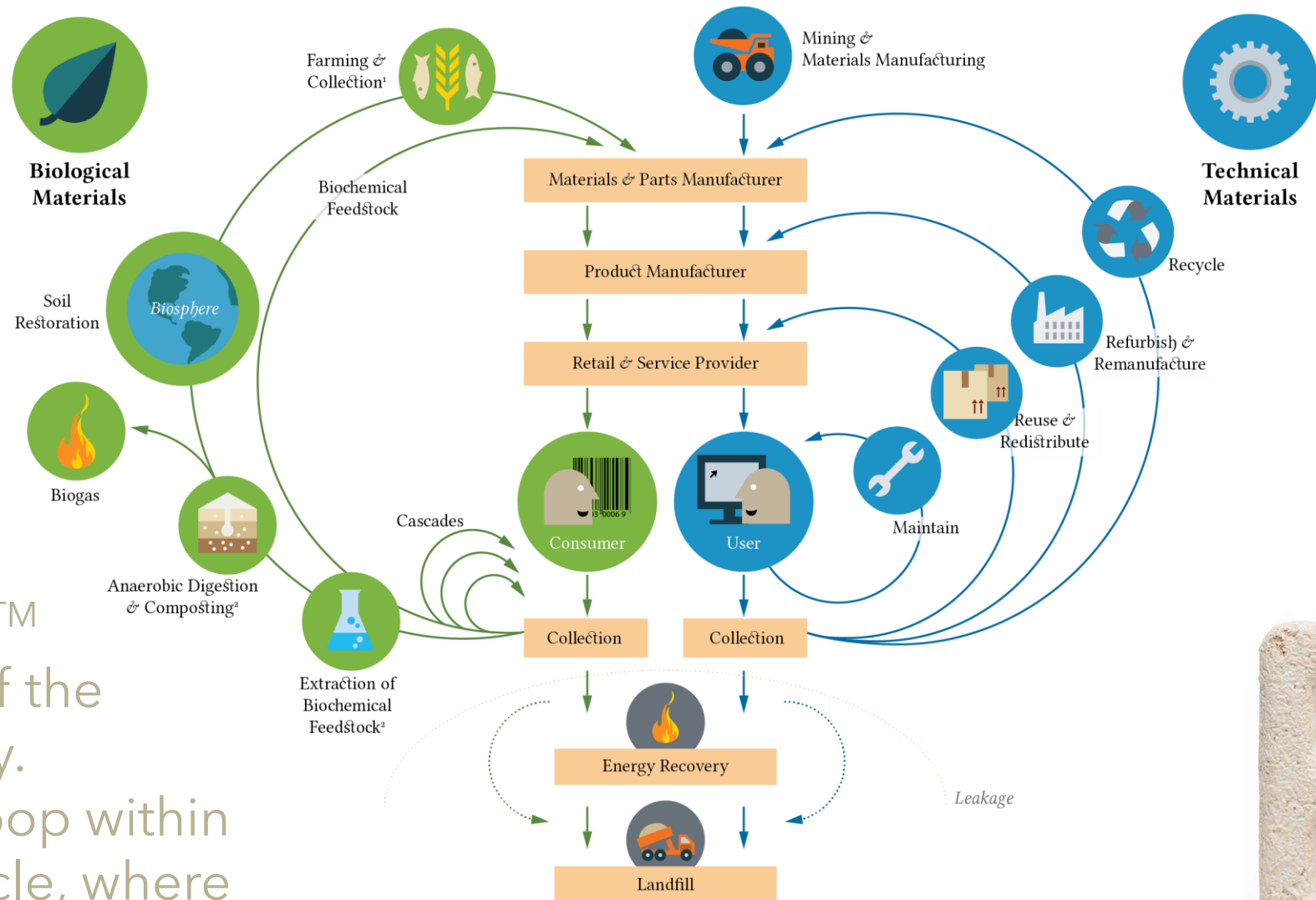
In the Netherlands, we mainly use hemp which breathes in 4X more CO<sub>2</sub> than trees

It's the only ingredient we use together with mycelium!

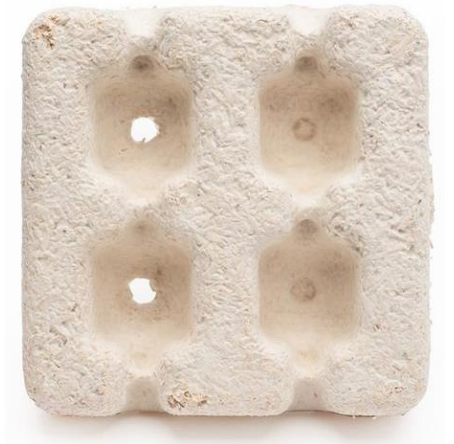
We are testing many different agricultural waste products to be able to respond the needs of your region



# Mushroom<sup>®</sup> Packaging is **circular by design**



MycoComposite™ fits to the heart of the Circular Economy. A 100% closed loop within the biological cycle, where waste becomes input!





# Mushroom® Packaging **uplifts your brand**



Unique texture and design  
Elegant, natural look and feel  
The best sustainability story



Mushroom<sup>®</sup>  
Packaging is a  
**patented  
innovation** from  
Ecovative in US  
licensed to  
**Grown.bio** in  
Europe





# What can Mushroom® Packaging offer **you** ?

## + **For your brand**

- Uplift
- Differentiate
- Tell a real sustainability story

## + **For your consumer**

- Surprise her
- Make her feel good about her choice
- Remove her pain of getting rid of waste (2<sup>nd</sup> life or compost experience)

## + **For you**

- Join the pioneers who make a positive impact
- Remove dependency on a finite resource
- Remove risk of bad reputation

## + **For (y)our planet**

- Leaving a livable planet for the future generations





# Interested? Here is how it works for **your product**

**1**

## Sketching (~2 weeks)

What are the requirements of your packaging that you want to 'grow'? We brainstorm together on what is possible

**2**

## Rendering (~ 1 week ) ~€150

3D image by our designers of your product

**3**

## Prototyping (~ 2 days ) ~€600

We make a 3D printed mould, in which your first product will be grown!

**4**

## Prototype production (~ 1 week )

### Prototype approved

**5**

## Mould trays are produced (~5 weeks)

Your volume demand and frequency are used to calculate the # of cavities required. Long lead time is due to high demand and may vary.

**6**

## Production starts!

Initial investment: ~€750

Time before production: ~9 weeks



We 3D print our reusable moulds with a renewable biopolymer, and we can shred and reprint them over and over again in-house.



# Wondering about design limitations, here is our **short list**

**One flat side:** The substrate is filled into a mould, then taken out once grown. Think of it as a cake mould, one side should be open to fill and empty the mould which will be the flat side of your packaging.



**Positive draft angle:** To take the packaging out of the mould easily, a small draft angle is required.



**Walls at least 1,5cm thick:** otherwise MycoComposite™ becomes too fragile



It's also good to consider a shrink/expand possibility of the packaging of ~1-2mm since mycelium is a living organism

# And how about what is possible?

coating



extra branding by  
hot stamping



up to 4mm fine  
details on corners



seed paper for  
wrapping



- *indoors - any color*
  - *outdoors - protective  
(brown - transparent)*
  - *shape mask spray painting*
- All paint options are done manually





# How do these moulds work?

Each Mushroom® Packaging grows in a mould for 3 days  
The higher demand you have in a week, the higher # of moulds needed\*





# How about the **cost** of this miracle packaging?

The cost depends on a few variables:

- **standard** or **customized** design?
- how **much substrate**?
- how **many moulds** do we need?  
*(depending on your volume and lead time)*



We will be able to give you a **rough estimation** of price after you fill our initial form, and an **exact offer** after our prototyping phase.

Compared to Styrofoam? We are working everyday to be more competitive



# Meet **the team** behind the revolution



We are based in the Netherlands, led by Jan and Arthur as founders, a small team of passionate people.

A biotechnology company with a mission to grow products using nature's intelligence to leave a better planet for the future generations.

Can't wait to put your product in one of these ?  
Contact us @ [www.grown.bio](http://www.grown.bio)





# Frequently asked questions Over MycoComposite™

## **How is the texture of MycoComposite™ ?**

*Quite like Styrofoam™ , a little rough but smooth in general. Cork is also sometimes used to compare it to.*

## **How does MycoComposite™ packaging work with heavy products?**

*Absolutely amazing. MycoComposite™ is a robust material. Our first customer, a LED light seller for greenhouses, did drop-tests with their 42kg lamps with great success. Of course, for any new packaging design, it's important to do sufficient drop-testing like in any other project.*

## **Is there any hygiene problems I should consider with MycoComposite™ packaging?**

*MycoComposite™ is a very clean material, based on properly cleaned waste streams and a fungus that is edible. The mycelium itself may sometimes give off a white dust on your clothes. You can wipe that off with your hands or a moist cloth.*

## **Is there a "use by date" for mycelium packaging regarding storage?**

*If kept dry in a well-ventilated space at room temperature, it will stay well for years.*





# Frequently asked questions Over MycoComposite™

## **Is MycoComposite™ strong enough?**

*The cell wall of mycelium is made up of chitin, same material in some insects' shell which makes it very strong, like Styrofoam™.*

## **How does MycoComposite™ work with high quality/ scratch sensitive surfaces?**

*The texture of mycelium is suitable for scratch sensitive surfaces as it is quite smooth. We are already using it for laptops. The only downside is possible flaking, just like Styrofoam™, mycelium can flake which can be solved through different ways.*

## **How much does mycelium make up of the total composition of MycoComposite™?**

*We mix 10% mycelium, with 90% upcycled plant waste. Naturally as the product grows, mycelium increases.*





# Frequently asked questions Over Mycelium

@jonasedvard

## **Are there any down sides to mycelium?**

*Compared to its benefits, almost none 😊 but it can flake at times, just like Styrofoam™. It also can't be used as foil/film, needs to be at least 1,5cm thick, just like Styrofoam™.*

## **Do you need only natural materials as food for mycelium or could even plastic work?**

*Although there are aggressive mycelium types that could eat through plastic, we don't yet have experience with them. The study only exists at lab scale in Japan and UK. What we know is that the digestion takes a long time.*





# Frequently asked questions

## Over Grown.Bio

### **Where is your production site?**

*Our production is only in Heerewaarden, Netherlands for now. We have plans to open more locations in Europe as soon as possible.*

### **How did you start?**

*Reading about MycoComposite™ in 2015, Jan met with Ecovative, a US based biotech company, designer of MycoComposite™. After growing several objects in his own garage, he partnered with designer Eric Klarenbeek, working from the studio in Zaandam. Then Arthur Moree, the COO joined, and the move in a 100m<sup>2</sup> small factory was made. Since October 2020, Grown.bio is operating in its new factory of 600m<sup>2</sup> in Heerewaarden, Netherlands.*







# Frequently asked questions Over Sustainability

@jonasedvard

## **How long does the packaging take to be composted?**

*A tree is compostable, but it will take long if you leave it as an uncut trunk. If you cut the tree in little pieces, then it would be quickly composted. The same goes for mycelium. It will stay as is for as long as you want in your home. If you want to get rid of it, just break it into pieces and throw into your garden, and it will be composted in a couple of weeks.*

## **Is there a certification for home composability of MycoComposite™?**

*No. Certification bodies test what happens to the product when it's left in the soil. We know it will decompose as it's only mycelium and organic waste, what is already happening in nature therefore we don't want to waste anyone's energy. If necessary, certification bodies can provide a document stating the compostability.*



# Frequently asked questions

## Over Cost and Process

### **What is the cost of producing samples from prototype mould?**

*Roughly ~€650 including a 2 hrs of designing on CAD and printing the prototype mould. It could go higher or lower depending on the complexity of the design.*

### **Can you sign NDA?**

*Of course. We have a standard one that protects both sides. We would need one signed before we start designing for you.*

### **How much will my packaging cost?**

*Cost depends highly on the end design if we are looking at a customized solution. We can give you a rough estimate once we know your dimensions and volume estimations.*

### **Do you have a MOQ?**

*No, there is no economies of scale while growing our packaging however mould cost would be divided into more products as volume increases. However, if lead times are short, it will mean we need more moulds at once.*





# Frequently asked questions Over Cost and Process

@jonasedvard

## **Is it possible to brand the outer through embossing?**

*Yes, with an additional cost.*

## **Can I use my existing Styrofoam™ packaging design?**

*Yes but not completely. Due to the design limitations shared earlier, the existing design will have to be adapted. We could also consider a design from scratch that suits your product's requirements as well as MycoComposite™'s.*





Can't wait to share with others?





## Dutch Design Week 2019

"With The Growing Pavilion we show the possibilities and above all the enormous beauty of bio-based materials" -Company New Heroes, Amsterdam.

<http://thegrowingpavilion.com>





## Milan Design week 2019

In cooperation with Carlo Ratti architects for Eni, 62 arches and several pieces of design furniture were grown.

The artwork was shown in the botanical garden of Milan during the Design Week.





# Mushlume

Designed by Danielle Trofe





“Mycelium packaging replaces environmentally harmful plastics like expanded polystyrene or expanded polyethylene”.

**mybacs**<sup>®</sup>





Carbon negative  
packaging uplifting  
your brand identity



AMEN



"We haven't lost a single glass candle since we started using Grown's mycelium"

Häckels®





**bel** rebel



# Electronics

