Myko World

THE INDUSTRIAL MATERIAL OF THE FUTURE:

fungi

FROM SHROOM TO FULL BUILDING IN TWO WEEKS TIME

MEDICINE

Medicinal mushrooms are macroscopic fungi that are used in the form of extracts or powder to prevent, alleviate, or 'heal' multiple diseases. Due to their high nutrient profile of proteins, micronutrients and bioactive compounds, they are also used as dietary supplements.

The reishi mushroom, a popular medicinal all rounder.

The functional qualities of medicinal mushrooms are being increasingly recognised by the scientific community. According to a comprehensive review published in the International Journal of Molecular Sciences, many types of fungi have been found to possess anti-allergic, antimicrobial, antioxidative, anti-inflammatory, anti-cancer and immunomodulating properties.

Chaga - a shroom low in calories, very high in fiber and loaded with antioxidants.

They're not to be consumed as 'regular' mushrooms, as they tend to have a bitter and mud-like taste that's difficult to mask with other ingredients.

However, scientists point out that more research is needed to fully understand the clinical value of mycotherapy (mushroom supplementation). What's more, these supplements may need to be more tightly regulated to ensure they're pure and safe for consumption.

Cordyceps, also known as the zombie mushroom who infects ants and grows out of insects, has been proven to help with inflammation and low sex drive.

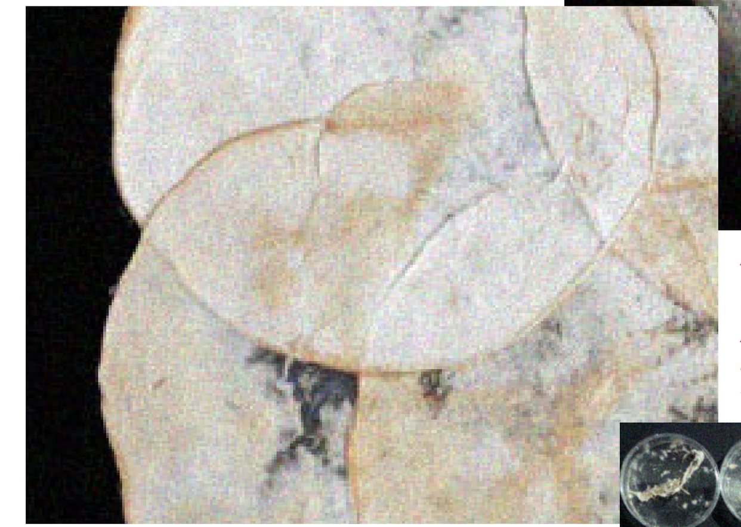
MYCOREMEDIATION

When it comes to mopping up our nastiest environmental messes, fungi may be one of the best hopes we've got. Certain species, including the oyster mushroom, produce enzymes that break down the tough, aromatic hydrocarbons found in petroleum, in addition to soaking up heavy metals like mercury. After this whole ordeal the mushroom leaves the earth restored to its former balance.
Proponents say it's a natural, more benign, and potentially cheaper alternative to the „scrape and burn" approach to environmental clean-up. But research funding is so hard to come by, it falls on citizen scientists and garage researchers to do the work.

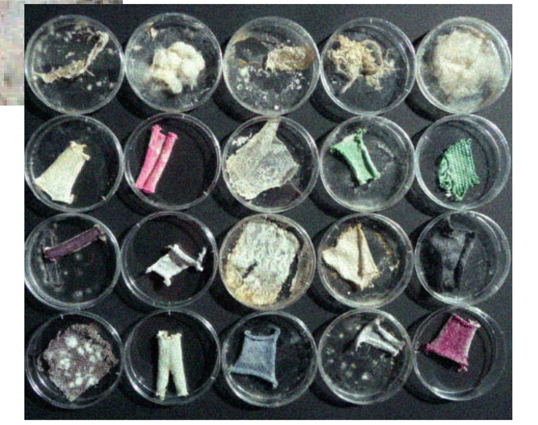
CLOTHING

„The world is dynamic, however our textiles are not," Hoitink said. „They have been with us all our lifetime, but they do not seem to have changed much."
Dutch textile designer Aniela Hoitink decided to create a flexible version of the material MycoTEX, now also called NEFFA, of which she is a founder. Hoitink used the mycelium modules to create a dress, which can be adjusted to adapt to fashion and can be repaired when needed. Once the garment has served its use, it can be composted. Considering the waste the fashion industry causes and the trend of 'fast fashion', textiles that are biodegradable are a welcome addition to our wardrobe.

Creating textiles out of modules provide several benefits. The fabric can be repaired without it interfering with its look. Additionally, a garment can be built three dimensionally and shaped according to the wearer's wishes while being made. The length of the garment can be changed, even made longer, or elements can be added. This allows for the growth of the right amount of material, eliminating waste.



Above: the stretchy wearable dress Aniela Hoitink grew out of mycelium



Stan Smith Mylo - the new shoe by Adidas made out of mycelium.

As a major global company, adidas has been part of the problem which is why we are committed to finding solutions. Our end goal? A fully circular future. One where adidas products are made using materials developed from natural ingredients, or with cells and proteins in a lab, so they can ultimately return to nature.
Together with the mushroom-leather producing brand MYLO, ADIDAS has created a shoe whose materials can be grown in just under two weeks, and stay new for as long as you need them.

A FULLY CIRCULAR FUTURE WITH FUNGI

Lampshades made by Sebastian Cox.

FURNITURE

Sebastian Cox has become the latest designer to start working with mushroom mycelium – the British furniture maker has teamed up with researcher Ninela Ivanova to investigate the material's potential in commercial furniture design.
Cox had long held an ambition to find a natural alternative to the glues used in engineered wood products, which is what led him to team up with Ivanova, who has been researching mycelium for the past seven years as part of a PHD at Kingston University.

„As a result, I've always had a kind of fantasy interest in ‚reinventing' a type of MDF and finding new ways to bind wood fibres into either sheets or mounded forms, ideally without glue." Cox said.

„It's not just about the fungus, it's about the marriage of the two materials," said Ivanova. „It's not sustainability for us – it's just what makes sense. These two materials have a natural relationship in the woodland, so let's see how we can exploit that."
The pair plans to continue the collaboration, with the aim to launch a full collection of mycelium and wood composite products in the near future.

Cox and Ivanova preparing a mix for a fungi to munch on.

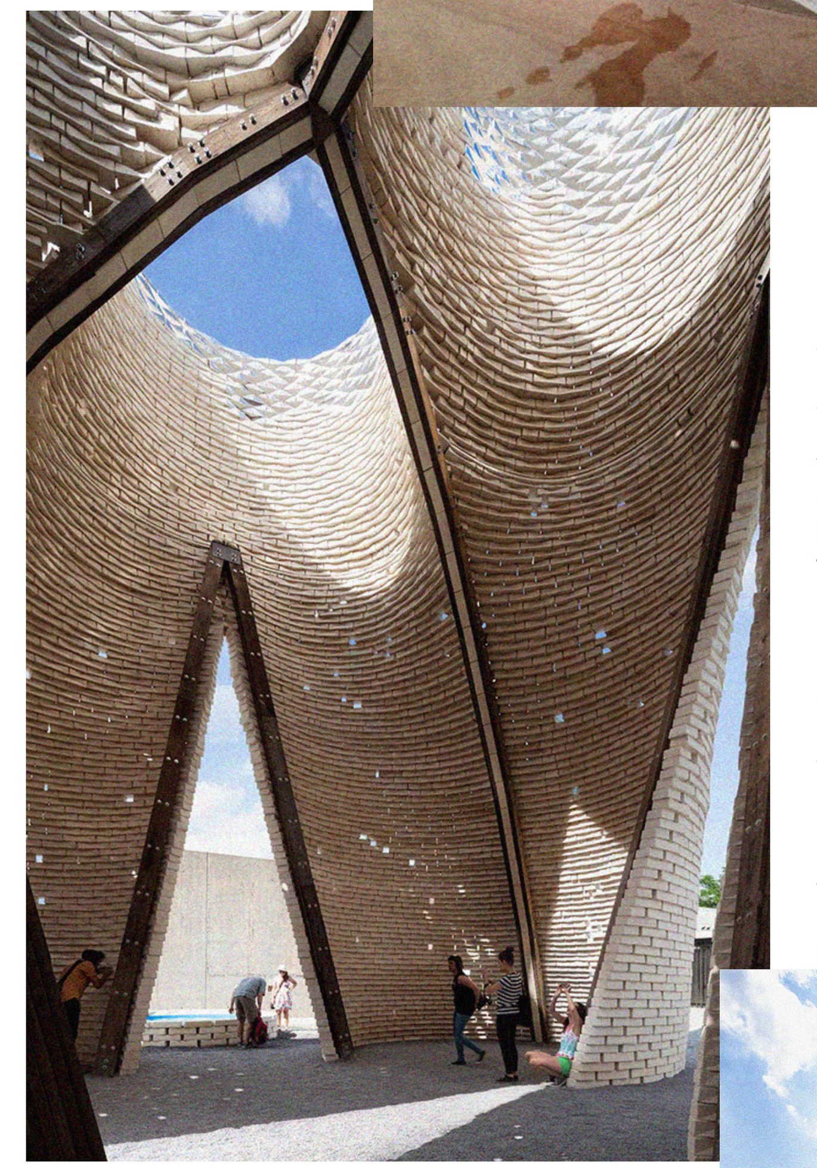
Another company, Ecovative uses several species of fungi to manufacture environmentally-friendly products. The process starts with farming byproducts, like cotton gin waste; seed hulls from rice, buckwheat and oats; hemp or other plant materials. These are sterilized, mixed with nutrients and chilled. Then the mycelia spawn are added and are so good at proliferating that every cubic inch of material soon contains millions of tiny fungal fibers.
This compact matrix is then grown in a mold the shape of whatever item Ecovative is making. Once the desired texture, rigidity and other characteristics of the product are achieved, it's popped from its mold and heated and dried to kill the mycelia and stop its growth.

The mycelium mix is shaped inside a plastic bag - to become the seating for a chair.

The same mycelium-wood mix Cox uses is already widely produced as packaging material.

MYCELIAL TISSUE CAN TRAP HEAT VERY WELL, IS NON-TOXIC, PARTLY MOLD AND WATER RESISTANT AND STRONGER THAN CONCRETE.

An insight into how each individual mycelial brick was formed.



BUILDING MATERIAL

What sets mycelium apart from other materials is its ability to regenerate at a quick rate. It can even be used for 3-D printing and is non-toxic, insulating, and all-natural. Mycelium has the potential to create a new paradigm for design in the building industry.

Here, a new type of brick has been designed of a combination of corn stalk waste and living mushroom mycelium. This organic mixture grows into solid bricks in five days with no added energy. The bricks are lightweight, low cost, and extremely sustainable.
When this building is deconstructed, the bricks are composted and the resulting soil is used by local community gardens
In that sense, this new biotechnological material is almost 100% grown and 100% compostable.

The HY-FY - an art project of the MoMA in New York from 2014.

Together for the future

Myko World