



THEME 01

Human death as a boost for the use of ecological materials

SOCIAL

CULTURAL

ENVIRONMENT

This autumn, the first human was buried in a coffin made of mycelium, the root network of mushrooms and nature's biggest recycler. It ensures a highly efficient transformation of remains into nutrients for the soil. The product ties in with a larger trend of using alternative materials that, contrary to stone, steel, wood, polymers or glass, are more compatible with the ecological processes of nature and/or are produced in an environmentally friendly way. The product has met with worldwide interest and could boost the reception of this controversial material. In some cases, it could even stimulate new uses and rituals.

Our observations

- We've [written before](#) that global problems such as climate change, the depletion of natural resources and waste call for sustainable, circular and adaptive solutions. Studies on organisms such as bacteria and fungi show that nature has a very efficient way to produce its basic elements such as lipids, protein and complex chemicals with minimal waste. Progress in areas such as biotechnology, bioinformatics and synthetic biology is making it increasingly easy to use these insights for our own production methods.
- In the West, the interest in the workings and possibilities of fungi is relatively new. According to biologist [Merlin Sheldrake](#), there are two reasons for this. First, technologies for scientists to fully research the world of fungi have only recently become available. Second, historically, there has been a deeply-rooted prejudice against fungi, which mainly invoke fear and disgust in us. For example, fungi were only recognized as a separate kingdom of life in the '60s. Before that, scientists studying fungi were classed as botanists, rather than as mycologists (fungus scientists).
- Fungi now appear to play a more important role in the carbon cycle than was previously assumed. [Studies](#) show that when plants cooperate with certain types of fungus, they can store up to 70% more carbon in the ground, which contains more carbon than the atmosphere and vegetation combined.
- Scientists are using mycelium more and more often to [make](#) all kinds of products, from packaging to plant-based meat, and even frames to grow new organs in. It also has great potential in construction, as an alternative building material that is both practical and benefits the climate. At last year's Dutch Design Week, a [building made of mycelium](#) was displayed.
- The ecological footprint of conventional funerals and cremations is substantial. In the U.S., cremations account for about [360,000 metric tons of CO2 emissions](#) per year. In India, emissions are much higher, and millions of trees are cut down each year to cremate the dead. The use of wood for coffins in the U.S. accounts for about 4 million hectares of forest per year, not to mention all the steel, plastic and toxic materials used to produce the coffins that end up in the ground. Moreover, a coffin delays the decomposition process, causing the body to produce toxins that also seep into the ground.

Connecting the dots

Mycelium feeds through hyphae, fungal threads, on the organic remains of trees, plants and dead animals. It can also neutralize the toxins that are released in the decomposition process. It's the fundamental link in the process of turning (organic) waste into nutrients for nature. The advantages regarding the sustainability of a mycelium coffin as opposed to a traditional stone or wood coffin, are considerable. It stimulates the decomposition of the body as well as the conversion into nutrients for the environment, and the process can be complete after only one year. By comparison, a wood coffin in fact delays the decomposition process (on average, it takes ten years), causing the body to produce toxins which eventually end up in the ground. Furthermore, no glue, lacquer, paint, metal or plastic is used in the production of a mycelium coffin, also sparing the soil some toxic pollutants. In addition, a chipboard or wooden coffin on average needs a year to decompose and a mycelium coffin is absorbed into the soil after 30 to 45 days. Finally, mycelium can be produced very sustainably and locally, using organic waste and without carbon being released. In that sense, this product ties in perfectly with the trend of environmentally conscious products such as meat substitutes, sustainable materials in fashion such as bamboo or henpep and energy-saving systems. The mycelium coffin was thus developed from a practical perspective on the ecological footprint of our final resting place.

There are, however, long-standing traditions surrounding the process after we die. Jews, for instance, bury their loved ones in a raw pinewood coffin, Muslims bury the dead on their right side, wrapped in a white cloth and without a coffin, Hindus often opt for cremation as it is the fastest way to return to "the source". Additionally, in many cultures, it's customary to

give the deceased various objects and to create some type of permanent memorial. In secular funerals, many of these customs have remained. With this alternative option for burial, dominant values around sustainability gain prominence in this domain, and it brings its own, new uses and rituals. For example, it's possible to give the deceased seeds so that the body can provide nutrients for the new life that will issue from the seeds. The use of a tombstone or other permanent memorials does not appear to be consistent with this new form of burial, which is meant to correspond to the biological processes of nature as well as possible.

The idea of life after death thus maintains a place in our secular worldview, albeit in a very singular way. With this, we're breaking with old values of, for example, Christianity or certain Chinese practices and rituals in this context. In these practices and rituals, it's of the utmost importance that the soul of the deceased is treated a certain way after their death, in view of the afterlife. At first sight, this new type of burial doesn't appear to be consistent with these principles, and it seems to mostly be in concordance with the [secular values of sustainability](#).

According to a [study](#) by the Pew Research Center, globally, the religious population is growing. And yet, the alternative of the mycelium coffin has been met with worldwide interest, including in non-Western countries such as [Thailand](#) and [India](#). It's not the first time religious people have shown the willingness to make concessions to sustainability when it comes to burial rites. Certain communities in India, for instance, have accepted a [non-traditional](#) but sustainable manner of cremation that requires only a fourth of the wood required in traditional cremations. Generally, modern values have often been known to affect religious customs.

Implications

- **In the U.S., among other countries, cremation is now [more often elected](#) than burial, mainly out of the desire to be environmentally friendly. If the mycelium coffin turns out to be a significantly better alternative to traditional burial than cremation in that respect, people might revert back to burials. However, traditional burial grounds don't have sufficient room to accommodate a large increase in burials. But because this form of burial purports to benefit the soil, regulations on which locations may be used as burial grounds might be adjusted. Governments' desire to plant more trees could, for example, play a role in this. In this way, new values could emerge with respect to the final resting place of our loved ones.**
- **The mycelium coffin is the first applications of living mycelium that could be relevant to everyone. After all, every person dies sooner or later, and this is one of the first scalable, sustainable and affordable alternatives to traditional burial or cremation. This product could therefore have an important impact on our acquaintance with and subsequent acceptance of mycelium as a usable material in our living environment.**