Growing Sustainable Packaging Material With Mycelium and Agricultural Waste

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An experiment was conducted to test the efficacy of growing custom-shaped composite packing material using mycelium and corn husk fibers, combined and grown into a composite material in simple and complex forms with 3-D (three-dimensional) printed molds. To mimic shapes found in non-renewable materials such as polystyrene packaging materials, simple and complex shapes were prepared and filled with mycelium (Pleurotus ostreatus, common name: oyster mushrooms) and corn husks, then grown in darkness for 10 days. After 10 days, mycelial growth was observed interwoven with the corn husk, one of the flat and two 3-D molded shapes were dehydrated, creating a composite material that is sustainable and biodegradable, and other molded shapes were observed over days 10-20 for signs of mushroom fruiting. This project tests whether composite mycelium packaging material can also produce harvestable mushrooms prior to dehydration. To investigate whether fruiting is possible with corn husk mycelium composite, the flat, rectangular forms were allowed to inoculate for an additional 10 days (days 10-20), to allow the fruiting process to occur. After fruiting, the mushrooms growing on these mycelium/corn husk composite blocks can be harvested, and the remaining mycelium/corn husk composite material can be dehydrated for packaging material. The hypothesis that if mycelium is mixed with agricultural corn waste and grown in a mold for 20 or more days, then a fruiting mycelial body (mushrooms), as well as a biodegradable composite packaging material will be created, was confirmed. The experiment demonstrated an effective process for converting mycelium and agricultural waste into usable packaging material and confirmed that the material can produce edible fruit prior to dehydration.

Awards Won: