Mushrooms as Reducers of Trash

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Areas of Science: Biology

Definition of the Problem:

Since the 1960s, over 8.3 billion tons of plastic have been produced. 40% of this production has been for packaging that is used once and discarded. Landfills receive about 27 million tons of plastic every year in the United States alone. To solve the growing problem of plastic pollution, researchers have begun to look for methods by which plastic can be decomposed. This led to the discovery of plastic-eating mushrooms.

Mushrooms can obtain their nutrition from metabolizing nonliving organic matter. They can send little seed-like [the spores are seed-like but not seeds.] “Fungi have a unique propensity for breaking down chemical pollutants (including oil and pesticides) by producing ENZYMES (Ali & Di, 2017).” We need to clean trash because if we don’t it will send toxins into the air and we might kill our planet. Mushrooms can help this solution by breaking down chemical pollutants like plastic. For this project, we have decided to focus on mushrooms because they can clean our world by breaking down compounds in plastic. Changing trash into soil takes two weeks to several months and creates new nutrients. Through research, it has been found that Pestalotiopsis (pes-ta-low-tee-op-sis) fungi can decompose plastic. Most mushrooms are capable of decomposing plastic and they are edible. In our first experiment, we will grow mushrooms and

see if plastic will decompose. “PETA turns garbage into food.” (Hildebrant, 2020) Microbial life can be used to eat plastic through supercharging bacteria and create mutations by using supercomputers to redesign enzymes.

Problem Solution:

It’s necessary to find the best combination of conditions for fungal growth to decompose pollutants, by coding a new program to tell about these kinds of pollutants and to find more information through the recycling of mushrooms. Astoundingly, these mushrooms can survive on plastic alone. The fungi consume polyurethane and convert it into organic matter. This plastic-eating mushroom can also live without oxygen – making it the perfect candidate for cleaning up landfills. Therefore, we will be researching these mushrooms: Blue Oysters, Black Pearl, and Golden Oysters. We will be adding plastic and managing the watering daily to see which oyster will decompose the plastic the fastest and most economical.

Our Progress:

We took a field trip to the NM Fungi Institute to learn about mushrooms in New Mexico. When we arrived at the Institute-Estevan Hernandez was our guide. He owns and operates the institute on a daily 24/7 basis. We walked around their facility to research how the mushrooms are grown. The institute uses sawdust and rice to grow their mushrooms. They use big batches of soil and other minerals and stuff to create the best product for eating and making tinctures for ailments. He explained how they harvest and regrow mushrooms to sell and recreate products.

The mushrooms we will be researching are: Lennon is growing Golden Oyster mushrooms, Elias is growing Black Pearl mushrooms. Alexandrea and Zoey are growing Blue Oyster mushrooms. Each mushroom has unique qualities that will encourage decomposition and growth. We hope that each mushroom will exhibit the decomposition of plastic in different ways so we can have a basis for how trash and mushrooms work together to decompose trash through the process of decomposition.

Coding Plan:

We will build a model where the mushrooms will decompose plastic and grow new crops with mushroom soil. We will manipulate the temperature, humidity, and soil type so we can find the best place for our plastic-decomposing EX: volcanic island. We'll be programming on NetLogo because it's the best language for the coding world.

Expected Results:

The oyster mushroom is capable of decomposing plastic and it's edible. In our first experiment, we will grow mushrooms and find out if we can dissolve plastic. This experiment will be conducted for several weeks to determine if plastic can be decomposed in mushrooms.

Works Cited

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