Colorado Science and Engineering Fair

2024 Team Project Abstract Form

Please print 2 copies of the completed form. Sign both copies, keep 1 for your notebook and submit 1 copy to your Regional Fair Director with your other paperwork.

Title of Project: Biodegradation of Plastics by Pleurotus ostreatus

Team Leader's Name: Amanda Castillo-Lopez

Team Member 1: Caitlin Dong

Team Member 2:

School and City: Cherry Creek High School, Greenwood Village

Sponsor's Name: Ethan Dusto

Category: Plant Sciences (PLNT)

Division: Senior (9th - 12th grades)

Abstract (250 words or less):

Plastic pollution has become a significant issue due to the excessive usage and increased production of plastics. Microplastics from both conventional plastics and biodegradable plastics can have ecotoxic effects on organisms. Alternatively, in the biodegradation of plastics where fungi and bacteria are predominantly involved, fungi produce various enzymes that break down polymers into small monomers. The monomers can then pass through the microbial membranes and be used as carbon and energy sources. The biodegradation process can also create other byproducts more susceptible to natural degradation. White-rot fungi usually grow on wood, breaking down lignin in plant cell walls for nutrients from the plant. The fungi strains break down lignin with ligninolytic enzymatic systems, able to degrade a wide range of molecules. Evidence towards the direct involvement of white-rot fungi or lignin degraders in polyethylene (PE) degradation indicates the ability of white-rot fungi to degrade plastic polymers. Given the viability of using white-rot fungi to degrade plastics, Pleurotus ostreatus in particular, this study aimed to test how efficiently P. ostreatus can degrade plastics which are often landfilled because of difficulties in recycling them. P. ostreatus was grown on diapers, take out containers, and plastic grocery bags, which are slow-degrading plastics commonly found in landfills. We found that the mycelium may have had a significant impact on the tensile strength and strain of the plastics (particularly the plastic bag and diaper), however other material tests would need to be performed to confirm this finding.

We hereby certify that the above statements are correct and the information provided in the Abstract is the result of one year's research. We also attest that the above properly reflects our own work.

Team Leader's Signature: Amanda Castillo Lopez Date: 3-7-24

Team Member 1's Signature: Caitlin Dong Date: 3-7-24

Team Member 2's Signature: _____ Date: _____

In addition, all students must complete the ISEF Student Checklist (1A), Research Plan, Approval Form (1B), and Checklist for Adult Sponsor (1), and any other ISEF forms required for this type of project. See the International Rules and Guidelines for form requirements. Return COPIES of all of these forms to your Regional Fair Director with your Finalist Verification/Permission Form. A signed copy of this form must be included in your notebook.