Using Stropharia Mushroom Mycelium (S. rugosoannulata) and Waste Treatment Residual for Filtration of Nitrate/Total Dissolved Nitrogen and Phosphate from Agricultural Runoff to Prevent Harmful Algae Blooms, Year Four

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Harmful Algae Blooms (HABs), which are fatal to aquatic ecosystems, human health, and water-reliant industries, largely occur because of an unnatural increase of Nitrate and Phosphate and are an increasing problem globally. The long-term goal of this 5-year study is to develop a low-cost and eco-friendly method for preventing HABs. Results from previous phases of this study along with other studies suggest that Stropharia (S. rugosoannulata) Mycelium (SM), which is the root structure of the Stropharia Mushroom, and Waste Treatment Residual both have water filtration properties. The purpose of the 4th phase of this research was to determine the field implementation potential of SM when colonized on Organic Substrate, SM when colonized on Alder Sawdust, and Waste Treatment Residual Mixed with Alder Sawdust treatments at agricultural settings for Nitrate and Phosphate filtration from polluted agricultural run-off. Field implementation potential was determined by implementing the aforementioned treatments inside of self-designed Agricultural Runoff Simulators, where their impact on the Nitrate/Total Dissolved Nitrogen, Phosphate, and pH Levels of Simulated Agricultural Runoff (SAR) along with soil pH and Spinach (S. oleracea) growth was measured over 32 days. Additionally, the effect of SM on Spinach growth was studied in self-designed Spinach Growing Cups. It was found that that all three treatments can effectively filter Nitrate and Phosphate from SAR despite periods of prolonged saturation (>32 days) without drastically altering the pH of SAR. Additionally, none of the treatments nor SM had any statistically significant impact on Spinach growth or soil pH. The results suggests that the treatments have potential for field-implementation in the next phase of this study.

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