An Innovative Approach To Manage the Environmental Impact of Agricultural Drainage Water

Kratcha, Gavin (School: Hankinson Public School)

Agriculture is an ever-changing industry. Agricultural drainage tiling has become much more common in recent years. Agricultural drainage tiling has numerous benefits, but there are drawbacks. One major drawback of tiling is the offload of nutrients into the discharged water. The loss of these nutrients causes financial burden for farmers and eutrophication. I wanted to find a way to stop nutrients from entering the waterways without harming the farmer. I decided to test chemical and natural means of filtration. I used 3 strong base anion exchange resins and 5 crop residues as filtration mediums. I used simulated tile runoff to pass through the filters for my testing. I tested the water that ran through the filters for Nitrates, Phosphates, Salinity, Conductivity, and pH. After I conducted these tests, I conducted a lettuce seed bioassay to test for toxicity. This test was used to determine if toxicity is transferred from the filters to the water samples. From the data I collected, I found that the strong base anion exchange resins were the best at filtering nutrients and toxicity. Coconut fibers also filter nutrients from this water well, but they do break down and release nutrients into the water over time. This is one drawback of many natural products. Eutrophication is a pressing issue in the world, and it may be possible to prevent eutrophication and reclaim nutrients using strong base anion exchange resins. The use of strong base anions could prevent eutrophication and recover the costs of lost nutrients.

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