Pest Buster! Pests Repelling Biodegradable Weed Barrier Infused with Grape Skin and Turmeric Extracts: Year 2 Study

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Over the years, around 20% to 40% of global crop production has been lost because of pests and bioactivity. At the same time, the weed barriers had caused the soil to be unsuitable for plant growth. To address this issue, this study investigated the efficiency of an engineered biodegradable weed barrier that can repel agricultural pests. This project was conducted using the following methods: Both grape skin and turmeric were soaked in ethanol. After a 3-week period, the pure extract was collected using a rotary evaporator ran at 100 rpm at 60oC. The peels were then dehydrated in a digital incubator. The weed barrier was engineered by mixing starch, glycerin, vinegar, distilled water and sodium alginate on a hot plate. Next, the weed barrier was placed under food sources inside a container filled with pests (fruit flies, termites, and pill bugs). The pests were observed for 30 minutes and pest preference was recorded. The barrier was also tested for antifungal properties using Aspergillus niger. Lastly, the weed barriers were buried in garden soil for a month for a biodegradation test. The results showed that the biodegradable weed barrier had a significant effect on repelling the pest (p-value<0.5, Chi-square). The weed barrier also showed significant biodegradation rate (Grape peels= 74.8%, Turmeric= 64.4%) with p-values <0.05 (T-test). Lastly, the weed barriers also exhibited antifungal effects against A. niger with all zones of inhibition higher than 15mm. This research demonstrates pest repellant applications for farming agencies to utilize instead of harmful pesticides.

Awards Won:
University of Arizona: Renewal Tuition Scholarship
Arizona State University: Arizona State University ISEF Scholarship (valued at up to $58,000 each)
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