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| Project Number: | 2022-47 |
| Project Title: | Exploitation of weed species extracts as an effective and environmental friendly strategy to control insects and deer in soybean |
| Organization: | Mississippi State University |
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| During this period, we enhanced the performance of the sicklepod seed extract by encapsulating the extract, which is rich in anthraquinones, in liposomes. This encapsulation was done in collaboration with the MSU Chemistry Department, achieving a size of 122 nm and a concentration of 15 nM. These liposomes will improve the extract's adhesion to plant surfaces and reduce degradation, especially under challenging environmental conditions. Treatments were applied to soybean plants (AG24X7 cultivar) at the V2 growth stage to assess their effectiveness.Soybean plants were grown in a greenhouse using polyethylene pots filled with a mix of potting and field soil. We tested three treatments: T1 (control), T2 (extract with non-ionic surfactant at 25%), and T3 (liposome-encapsulated extract with the same surfactant). Fourteen days after planting, we simulated rainfall (1 inch per hour for 30 minutes) to evaluate how well the treatments held up under real-world environmental stress. This setup allowed us to test not just the repellent effectiveness but also how well the treatments adhered after exposure to rain.From initial observations, both T2 and T3 caused visible damage to the soybean leaves, with more severe injury in T2, which did not include encapsulation. This showed that while the extract is effective, its current concentration might be too high for the plant to handle. After the rain simulation, we collected and analyzed plant samples with HPLC, which confirmed the retention of phenolic compounds but also highlighted the need to lower the formulation’s concentration to prevent damage to the plants.Moving forward, we will adjust the extract concentration to reduce phytotoxicity and test lower doses in upcoming trials. This is a critical step to ensure that the formulation can provide effective pest control while maintaining plant health, making it a practical and sustainable solution for soybean production. | |