Quantifying Acetochlor Thermal Stability

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Acetochlor, the active ingredient in Warrant®, is a chloroacetamide herbicide, has a water solubility of 230mg/L, is broken down in soil through microbial degradation, and provides residual control of various small-seeded broadleaf and grass weed species. Warrant® is formulated as a slow-release, polyurea microencapsulated herbicide that, depending on the amount of irrigation or rainfall received, could provide weed control for up to 30 days after application. While acetochlor is known to cause injury to peanut during cold and wet weather, Georgia growers can include Warrant® in EPOST or POST tank-mixtures, which coincide with soil temperatures of 27 - 40°C. Studies were conducted using a thermal gradient table to determine the effect of temperature on the behavior of the micro-encapsulated formulation of acetochlor. Acetochlor thermal stability was evaluated over a temperature gradient of 20 - 50°C for 11 days. Samples were pulled from the table at 0, 6, 12, 24, 48, 144, and 240 hours after the start of incubation and analyzed for acetochlor concentration. Data indicated that temperature had a direct effect on the amount of acetochlor released into solution. Although acetochlor has shown injury in cold and wet environments, this data also indicates that the release of acetochlor into solution was increased as temperature increased. Further research is needed to evaluate the degradation of acetochlor once released from micro-encapsulation at these varying temperatures over time.