The Bioactivity of Lepidium sativum Meal on Aquatic Organisms

Tophoj, Michael (School: Ogallala High School)

Mosquito control is a fast-growing issue as cases of mosquito-borne diseases are on the rise in America. Research has shown that Lepidium sativum meal byproduct is a highly effective larvacide for the control of mosquitoes. This investigation examined the effect of Lepidium Sativum meal on aquatic organisms. It was hypothesized there would be a 100% mortality rate on both aquatic plants and other invertebrates with the addition of prepared Lepidium Sativum meal. The studies were conducted on algae, duckweed, aquatic macroinvertebrates, snails, crawfish, and mosquito larvae, all studied independently. Organisms were subjected to an environment of 0.19g of mustard meal per 300 mL of water for 48 hours. For the investigation, mosquito larvae were used as a procedural control, resulting in a 100% mortality rate in 24 hrs ($p= 0.0075$). Snails ($p=0.00020$) and crawfish ($p=0.096$) were all observed to have a 100% mortality rate after 24 hours. Aquatic macroinvertebrates were analyzed using sample counting, also having a 100% mortality rate ($p=0.0017$). Algae ($p=1.0$) showed no significant change in Turbidity. Duckweed showed an initial significant change of light reflectance in the first 24 hours ($p=0.030$), and not quite significant change after 48 hours ($p=0.096$). These results indicate that Lepidium Sativum meal in water extremely affects invertebrates, but only slightly affects plants after 24 hours. Future studies could explore the lethal dose of Lepidium Sativum meal, its application in different environments, and its lethality on larger organisms.

Awards Won: