World Academy of Science, Engineering and Technology
International Journal of Health and Medical Engineering
Vol:13, No:09, 2019

Effect of Cadmium and Zinc on Initial Insect Food Chain in Wheat Agroecosystem

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Abstract : Due to geogenic and anthropogenic factors, heavy metals concentrations increased throughout the world and deposit into soil. Thus available to different plants and travel in different food chains. The present study was designed to achieve bioaccumulation of Cd and Zn in the wheat-aphid-beetle food chain. For this purpose, wheat plants were grown in three different treatments: Cd, Zn, Cd+Zn. Data showed that Cd content in soil and wheat plant increases with increase in Cd concentration while plant weighs, panicle weight, seed number per panicle and seed weight per panicle decreases with increase in Cd content in the soil. Zn content in soil and wheat plant increases with increase in Cd concentration while plant weighs, panicle weight, seed number per panicle, and seed weight per panicle increase with an increase in Zn content in the soil. With the addition of Zn in Cd-treated soil, the uptake of Cd decreases in all parts of wheat plants. Bioaccumulation from wheat plant to aphids and then its predators were also studied. Cd concentration increases from low to high concentration in all arthropods. Same was observed in Zn concentrations, while in Cd+Zn, Cd accumulation decreases but Zn accumulates increases. Health risk index (HRI) also showed that in the presence of Zn, the HRI improves and can help to reduce health risks associated with Cd.

Keywords : aphid, beetle, bioaccumulation, cadmium, wheat, zinc
Conference Title : ICFST 2019 : International Conference on Food Safety and Toxicology
Conference Location : Zurich, Switzerland
Conference Dates : September 16-17, 2019