Insect Physiological Markers Detecting Environmental Pollutants: Heavy metals and Dioxins

Yonggyun Kim, Youngjin Park, Won Kyoung Lee[1] and Keon Sang Ryoo[1]

Department of Agricultural Biology, Andong National University, Andong, Korea

[1]Department of Applied Chemistry, Andong National University, Andong, Korea

Sensitive physiological characters have been attempted to use to detect environmental pollutants contaminated in the field samples. The characters (nodule formation, PLA2 inhibition and hemocyte apoptosis) were selected from the insect immune systems and have been shown to be highly susceptible to some heavy metals and dioxins. Using these markers, the pollutant-discriminating matrix was constructed and tested for identification of the contaminants in the environmental samples. The results were compared with those of the chemical residue analysis. Out of 11 freshwater samples collected in different locations, three samples proved to have been contaminated with lead and dioxins by the physiological markers. The biological detection was supported by the chemical analysis of the residues. This approach suggests that the biomarkers are sensitive enough to determine the contaminated samples and discriminate the nature of the contaminants.