Application of double staining method using fluorescent dyes on Daphnia magna to assess bacterial effect

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Daphnia has been widely used as indicator specie in aquatic biomonitoring for decades. Traditonal toxicity assays based on lethality take long time to assess and the effect modes of contaminants are not clear. Due to the translucency of Daphnia body and the application of fluorescent probes in cell staining, different parts of its intoxication can be visualized. In this study, double staining method using two fluorescent dyes, Calcein AM and Propidium Iodide, was carried out on Daphnia magna exposed to various bacteria strains: Salmonella and Shigella. Results showed that those bacteria caused disparate effects on Daphnia depending on age of this organism and bacteria concentration. Moreover, the damaged areas of Daphnia body were directly observed via microscope, contributing to the understanding as well as the prediction of toxicity mechanisms. *This work was supported by "Cooperative Research Program for Agriculture Science & Technology Development (Project title: Development of Synthesis Technology of Plant Physiologically Activating Compounds by Genetically Reconstructed Photosynthetic Microorganisms, Project No: PJ01051501)" Rural Development Administration, Republic of Korea.*