

To evaluate the toxicity of nickel to earthworm, we conducted soil acute assay, *in vivo* and *in vitro* cytotoxicity tests. Overall, *P. excavates* were sensitive than *E. andrei* to nickel in the bioassay and cytotoxicity test but survival rate and abnormality rate of both earthworms were negligibly affected up to 1000 mg/kg soil. According to Reinecke et al. (2004)⁶, nickel breaks the DNA strand and cause DNA-protein cross-links by ROS^{24, 25}, as well as inhibit DNA repair system²⁶. Also lysosomal membrane stabilities of earthworm were affected by nickel concentrations in soil⁴.

In this study, we observed that nickel induced cytotoxicity by inhibiting intracellular esterase activities in earthworm coelomocytes via *in vivo* and *in vitro* tests with flow cytometry after calcein-AM staining. We suggest that application of calcein-AM staining to earthworm coelomocytes is sensitive method. This study would provide fundamental data of nickel earthworm toxicity.

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