Study of ecotoxicological effect and soil environmental criteria of heavy metal chromium (VI) in China

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Systematic study about water quality criteria is being carried out in China, but study of soil environmental criteria is comparatively insufficient. In this study, germination and root growth of 8 terrestrial plants (Triticum aestivum, Lactuca sativa, Cucumis sativus, Zea mays, Brassica pekinensis, Glycine max, Allium tuberosum, and Solanum lycopersicum) and growth inhibition of one terrestrial animal (Achatina fulica) were used to determine the chronic ecotoxicological effects of chromium (VI) using the agricultural moisture soil of Baoding. In addition, with the native toxicity data selected, the HC5 (hazardous concentration of the 5% species) and the ecological protected soil environmental criteria of chromium (VI) in Baoding moisture soil were calculated using the log-normal species sensitivity distribution (SSD) method. Results showed that NOEC (no observed effect concentration) values for the growth of the terrestrial plants T. aestivum, L. sativa, C. sativus, Z. mays, B. pekinensis, G. max, A. tuberosum, and S. lycopersicum, and the terrestrial invertebrate snail A. fulica were 19.0, 21.0, 28.0, 32.0, 32.0, 32.0, 32.0, 12.0, and 20.0 mg/kg, respectively. The comparison of species toxicity data that were tested in the same conditions showed that terrestrial plants S. lycopersicum was the most sensitive species to chromium (VI), T. aestivum and L. sativa had the same sensitivities to chromium (VI) exposure, whereas, plants C. sativus, Z. mays, B. pekinensis, G. max, and A. tuberosum had the same sensitivities to chromium (VI) exposure. Finally, the HC5 value of chromium (VI) in the moisture soil of Baoding was calculated to be 7.66 (4.12<CI<11.34) mg/kg using the log-normal SSD method, and the ecologically protected soil environmental criteria of chromium (VI) was 1.53~7.66 mg/kg. With the investigation of this work, we expect that it could provide useful information in the study of soil environmental criteria in China.

Recent Publications


Biography
Wang Xiaonan has his expertise in ecotoxicology, environmental criteria and risk assessment in China.

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