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The application of microbial indices as reference standards to improveNemerow index method in the monitoring and assessing of soil heavy metal pollution

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Abstract

The Nemerow index was based on the pollutant content and environmental standards, which do not consider the real effects of heavy metals to living creatures. Soil microbial community is very sensitive to environmental changes and their behavior can be properly investigated to reflect the effect of heavy metals. In this study we introduced microbial indices in Zhaoyuan gold deposit and Zibo iron deposit in Shandong Province to improve the traditional Nemerow index. Several key microbial indices were measured and given ordination by ecological methods, then their weighting values in the ordination were used as reference standards. The Nemerow index were improved by integrating microbial characteristics, which directed to reflect the influences heavy metal. Given consideration to real influences to living creatures, the pollution index can be quite different from what it was; meanwhile, C_{mic}, BAS and key microbial species can all be used as references to modify the Nemerow index. We found the modification of Nemerow index showed different trends in Zhaoyuan gold deposit and Zibo iron deposit because different microbial indices were chosen. The results clearly indicated the potentiality of microbial indices to reflect the real effect of pollution to life and the weighting methods calculated by ordination could work well. It is feasible and meaningful to use microbial parameters to supply complemental information to traditional environmental quality index. To further improve the soil environmental quality evaluation system, key microbial indices should be studied and the regulation of how they reflect environmental changes should be well considered.

Biography

Jiu-Lan Dai has completed her PhD at the age of 29 years from Shandong Agricultural University and Research Centre for Eco-environmental Sciences, Chinese Academy of Sciences, and postdoctoral studies from Shandong University School of Life. She is mainly engaged in the research on soil microbial ecology, soil pollution ecology, soil biogeochemistry and pollutants cycling in terrestrial ecosystems. She has published 34 papers in reputed journals and has been serving as a reviewer for several journals.