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Fertilization rather than aggregate size fractions shape the nitrite-oxidizing microbial community in a Mollisol

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How nitrite-oxidizing bacteria (NOB) respond to long-term fertilization and variations in soil aggregate levels remains unclear. In this study, the potential nitrite oxidation activity (PNO), abundance, diversity, and community compositions of Nitrobacter- and Nitrospira-like NOB were examined in three aggregate fractions (2000-250, macroaggregate; 250-53, micro-aggregate; <53 μm, silt+clay) of a Mollisol under four fertilization regimes. NOB abundances were higher in macro- and micro-aggregates, and best explained by aggregate size variation. The PNO, Shannon diversity index and community composition of NOB were more affected by the fertilization regimes. We found PNO significantly correlated with the structure of Nitrospira-like NOB, followed by the abundances and Shannon diversity indexes of NOB. Soil aggregate phosphorus level, total potassium, and NH4+ were associated with the NOB community structure. Our results suggested that PNO directly link to the variations for the abundance, diversity and community structure of NOB, which are regulated by the nutrient level in the microhabitat.

Biography

Wenli Chen has completed her PhD in 1994 from Huazhong Agricultural University. She is interested in soil aggregation on the stability and function of the microbial community. She has published more than 50 papers in Soil Biology and Biochemistry, Science of the Total Environment, European Journal of Soil Science, Chemical Geology et al. and serves as an editorial board member of Frontier in Microbiology.

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