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## Conducting Monitored Natural Attenuation: Microbial communities hold the answers

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The application of Monitored Natural Attenuation (MNA) technology has been widespread, while there is a paucity of data on groundwater with multiple co-contaminants. This study selected a high permeability and low hydraulic gradient with BTEX (benzene, toluene, ethylbenzene, and xylenes), chlorinated aliphatic hydrocarbons (CAHs) and chlorinated aromatic hydrocarbons (CPs) co-contamination to unravel the responses of microbial communities during natural attenuation processes. The results showed that the diversity and composition of groundwater microbial community exhibited greater variation horizontally than vertically. Groundwater microbial community was primarily shaped by the total quantity of contaminant ( $r = 0.722$ ,  $p < 0.001$ ), and BTEX would have a more significant influence on community diversity than CAHs or CPs especially at high zone. The groundwater microbial community assembly was governed more by deterministic processes ( $\beta\text{NTI} < -2$ ) than by stochastic processes in high contaminants concentration zone and showed an opposite trend at low-concentration zone ( $|\beta\text{NTI}| < 2$ ). The co-occurrence relationships among microorganisms indicated that the differences in degradation mechanisms at various depths. This study provided a better ecological understanding for preparation of long-term monitoring plan at further MNA practices of deep thick and multiple co-contaminants aquifers.

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### References

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