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Enhanced removal of *p*-nitrophenol in a microbial fuel cell after long-term operation and the catabolic versatility of its microbial community

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Abstract: Electrochemical technology was employed to degrade *p*-nitrophenol (PNP) in a microbial fuel cell (MFC). Approximately 81% of 50 mg/L PNP was degraded within 24 h by the anode at 28°C and pH 7.0. A significant interaction of temperature, pH, and initial PNP concentration was found for the degradation of PNP, and a theoretical maximum degradation rate of 95% was achieved at 34.63°C, pH 7.4, and an initial PNP concentration of 126.96 mg/L after a 3-day incubation. Moreover, after long-term operation, the anodic biofilm exhibited the ability to degrade various aromatic compounds, including chloramphenicol, benzofluorfen, fluoxastrobin, and flubendiamide. High-throughput sequencing analysis showed that functional bacteria of the genera *Corynebacterium*, *Comamonas*, *Chryseobacterium* and *Rhodococcus* predominated in the MFC anode biofilm. The complex syntrophic interactions among these functional bacteria were important for efficient removal of organic compounds. In conclusion, the MFC exhibited the potential to treat aromatic contaminants due to

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