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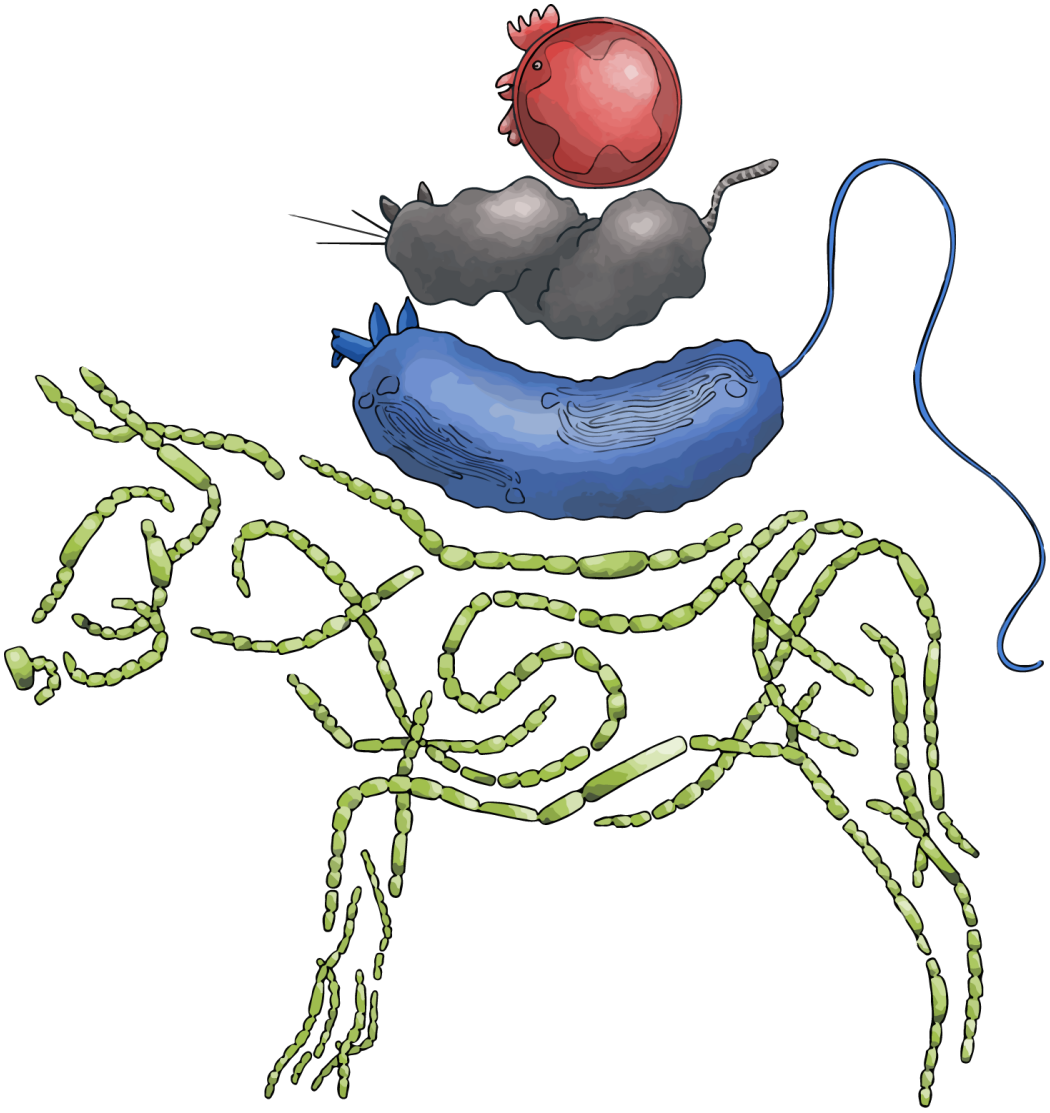
JUNE 22-26 2025
BREMEN, GERMANY



ABSTRACT BOOKLET

Assessment of the persistence and dissipation of biological nitrification inhibitors in a range of soils

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Biological nitrification inhibitors (BNIs) are emerging as a promising strategy to delay microbial nitrification, meeting the demands of sustainable agriculture for crop management and enhancing nitrogen use efficiency, while mitigating environmental concerns. However, little is known about the persistence of plant-derived BNIs in soil. In this context, we aimed to answer the following questions (i) what the dissipation time of most known BNIs in soil (ii) which soil physicochemical properties affect their dissipation rates ii) whether the microbial community is involved in the dissipation. We studied the dissipation of 1.9-decanediol, MBOA, sakuranetin, zeanone and its analogue 2-methoxy-1,4-naphthoquinone in 10 soils with diverse textures, pH and organic matter content. Dissipation of most BNIs was slower in acidic soils and tended to be faster in neutral to alkaline soils. For zeanone and 2-methoxy-1,4- naphthoquinone, DT_{50} values ranged from 0.29 to 88.5 days and 0.16 to 11.84 days, respectively, across all soils. Soil fumigation was performed on two representative soils—one acidic and one alkaline—selected based on the slowest and fastest dissipation rates. In both cases fumigation significantly retarded the dissipation of sakuranetin (DT_{50} 4.85 vs. 13.11 days in acidic, 2.68 vs. 9.23 in alkaline soil) and MBOA (DT_{50} 7.46 vs. 40.96 in acidic, 1.31 vs. 3.4 in alkaline soil), comparing non-fumigated vs. fumigated soils, suggesting a key role for soil microorganisms in their dissipation. Ongoing work will further explore correlations between soil properties and BNI dissipation (DT_{50s}), as well as the role of the microbial community in the dissipation of all BNIs.