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Bacterial biodegradation of organics and inorganics

Oral presentations

**BIODEGRADATION OF SODIUM LAURETH SULFATE BY
FACULTATIVE ANAEROBIC BACTERIA**

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Abstract

Surfactants are compounds commonly present in detergents and personal care products for cleaning and solubilisation purposes. After use these compounds end up in wastewater treatment plants or in the environment. Although many surfactants are readily biodegraded under aerobic conditions, in anoxic environments these compounds are more persistent. The lack of information on anaerobic microbial degradation of surfactants, led us to investigate the biodegradation of anionic surfactants using nitrate and oxygen as electron acceptors. Sodium laureth sulfate (SLS), 50mg.L⁻¹ to 1000mg.L⁻¹, was used as sole carbon and energy source for the enrichment of bacteria from activated sludge. Although primary aerobic enrichments grew faster than the anoxic ones, after several transfers to new medium SLS was rapidly degraded (less than 24h) under both oxic and nitrate reducing conditions, at all concentrations, and competent microorganisms were enriched.

Denaturing gradient gel electrophoresis (DGGE) was performed to analyse the microbial diversity of the different incubations. Results show that there is more variability of the microbial community among the enrichments with oxygen when compared to the enrichments with nitrate. Less diversity is observed when the concentration of SLS is higher than 250mg.L⁻¹, for both conditions. The DGGE-profile for 1000mg.L⁻¹ SLS is similar for both electron-accepting conditions, indicating the presence of possibly the same microorganisms in the last enrichments at this concentration. The molecular profiling also showed the presence of an abundant phylotype in all enrichments and at all concentrations and for both electron acceptors. This microorganism might be most important in the SLS degradation and its occurrence seems to be independent from the electron acceptor that was used. Besides, this microorganism appears to be a generalist where in the highest SLS concentration the presence of a specialist is suspected. Currently, the enrichments are further characterized and purified. With this research we will obtain more insight into the role of the terminal electron acceptor on the degradation of surfactants.
