**Multidimensional monitoring of anaerobic/aerobic treatments by hyphenated UPLC-ICP-MS/ESI-Q-TOF-MS techniques**

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Sulphonated aromatic amines form a group of anthropogenic compounds, which occure in several industrial wastewater treatment plants in large amounts (Singh 2015). As known transformation products, they have been found to be toxic and potentially carciogenic (Golka et al. 2004). With respect to economic aspects, the microbial treatment has received much attention as an environmental friendly degradation process of industrial wastewater (Sarayu & Sandhya 2012), where the accumulated aromatic amines, can cause problems in aerobic treatment steps.

Common parameters as the oxidation reduction potential, pH-value, color, conductivity, total organic carbon and dissolved oxygen were already monitored for process control. Furthermore the actual concentrations of sulphonated aromatic amines could be observed via automatic on-line LC-MS methods, as reported in previous experiments (Rehorek at al. 2002). For this monitoring, the sampling can be performed particle and oxygen free via filtration probes, which is necessary in anaerobic treatment steps.

In initial analyzes, hyphenated techniques with UPLC-ICP-MS/ESI-Q-TOF-MS were used to indicate biodegradation pathways in qualitative analyzes in recent experiments. For identifying certain compounds of interest, the retention times of the peaks obtained by ICP-MS in oxygen mode (m/z 48 SO+), were used as a marker for sulphonated aromatic amines. These substances can be identified subsequently by ESI-Q-TOF-MS with the exact mass. By comparing the treatment of individual and mixtures of anthropogenic substances, variations in biodegradation pathways could be shown. Additionally inhibited compound degradations by the presence of certain transformation products could be characeterized.

Beside mechanistic studies, the toxicity was determined on-line with the help of process analyzer. Therefore the inhibtion of the luminescence of *Vibrio fischeri,* the respiration rate of nitrificants and the growth rate of *Lemna Minor* were specified. First results have shown an increasing toxicity during the anaerobic degradation of certain anthropogenic compounds, where aromatic amines occur. The opposite effect was found out in aerobic experiments, where these amines are mineralized afterwards.

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