

## 18 Poster Presentation

**Determination of the  $^{12}\text{C}/^{13}\text{C}$  and H/D isotopic fractionation during biodegradation of decane in microcosms**

Melanie Hager<sup>1</sup>, Andrea Watzinger<sup>1</sup>, Markus Gorfler<sup>2</sup>, Paul Kinner<sup>1</sup> and Thomas Reichenauer<sup>1</sup>

<sup>1</sup>Health and Environment Department, Environmental Resources and Technologies, AIT Austrian Institute of Technology GmbH, Konrad-Lorenz-Strasse 24, 3430 Tulln, Austria.

<sup>2</sup>Health and Environment Department, Bioresources, AIT Austrian Institute of Technology GmbH, Konrad-Lorenz-Strasse 24, 3430 Tulln, Austria.

Bioremediation is a cost-effective solution for the clean-up of soil and groundwater environments polluted with hydrocarbons. During biodegradation the isotopic composition of a specific pollutant may change, therefore evidence of the clean-up process is provided and calculation of its extent is possible. At a contaminated site in Vienna the suitability of constructed wetlands filled with differing substrates for the removal of diesel hydrocarbons from groundwater is currently tested in at pilot scale. In this experiment the biodegradation process was simulated in the laboratory in gastight bottles filled with material from the filter bodies and groundwater or groundwater only from the pilot-site. The decane or a decane-ethanol solution was added and the concentration of decane and its  $^{12}\text{C}/^{13}\text{C}$  as well as H/D isotopic ratio were measured by GC-IRMS during. Microcosms with sand or clay pellets from the constructed wetlands showed immense growth of microbes for two weeks but no degradation of decane occurred. The  $\delta$ -value of decane remained constant at  $\delta^{13}\text{C} = -32\text{‰}$  and  $\delta\text{D} = -82\text{‰}$ . Furthermore, these microcosms showed anaerobic conditions after three weeks. The bottles filled only with groundwater from the polluted site showed degradation of decane and the decane-ethanol solution, but nevertheless no shift in the  $\delta\text{D}$ -value of decane. All assumed decane degraders were cultivated and sequenced and their growth with decane as sole carbon source was tested. Eight strains of closely related *Pseudomonas* species and one strain of *Serratia* sp. could be identified.