

# Evaluation of real bilge water toxic effects on methanogenic activity

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## Abstract

Bilge water (BW), an oily residue that is accumulated at the bottom of vessels, is mainly generated from pipes' and engines' leakage and consisted of lubricating and diesel oil, cleaning solvents, oily sludge and other hydraulic/engine spills from seawater filtrations as well as fresh and seawater. Undeniably, anaerobic treatment of BW could ensure energy and economic benefits as well as waste minimization. However, refractory organics present in BW is possible to inhibit the anaerobic biomass and production of methane-containing biogas. In the present study, Anaerobic Toxicity Assay (ATA) was used in order to evaluate the effect of BW on methanogenic activity of anaerobic granular sludge (AGS). BW was provided by Ecofuel Ltd (Zygi, Cyprus), which collects and treats this type of wastewater. AGS was collected from a mesophilic upflow anaerobic sludge blanket reactor (UASB). Batch experiments were performed in triplicate, using two concentrations of BW in combination with  $\text{CH}_3\text{COOH}$  and  $\text{HCOONa}$  to test the inhibition of acetoclastic methanogens and hydrogenotrophic methanogens, respectively. Gas measurements were taken daily up to four days and periodically thereafter during three months. Soluble Chemical Oxygen Demand (COD) and microbial community profile were also monitored over time.

*Keywords:* bilge water, anaerobic toxicity assay, anaerobic granular sludge, microbial consortium

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