

Acidification of Source-Separated Human Urine to Prevent Ammonia Transfer in the Membrane Distillation (MD) System

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Membrane distillation (MD) can be most effectively and beneficially used in water treatment in comparison to other membrane processes involving high energy and operating cost. This study was aimed to concentrate ammonia in the wastewater to recover nitrogen contents as a fertilizer. Direct contact MD (DCMD) module with flat sheet PTFE membrane was installed. Because ammonia is highly volatile at high pH, the ammonia transfer through MD membrane was investigated at different pH conditions with synthetic human urine samples. It was concluded that pH lower than 6 effectively prevents the ammonia transfer. Based on the preliminary test data for pH effects, dewatering experiments using MD on original and acidified human urine were tested at 60 °C of feed temperature and 20 °C of produced water. The acidification prevents the ammonia transfer upto 95% and the membrane fouling was simultaneously mitigated. For investigation of the membrane fouling, membrane surfaces was systematically examined by SEM, EDX and FTIR.