

Field test of a membrane contactor process for ammonia recovery from anaerobic digestion leachate

*Lee Songbok¹⁾, Daeho Lee²⁾, Dongook Choi²⁾, Jieun Kim²⁾ and Youngjin Kim³⁾

^{1), 2), 3)} *Department of Environmental Engineering, Korea University, Sejong-si 30019, Korea*

³⁾ kyuksh@korea.ac.kr

ABSTRACT

Due to the global warming, policies are being established to reduce the use of fossil fuels and expand the use of new and renewable energy sources. Among these, hydrogen is gaining attention as a clean energy source, leading to extensive research and projects focused on its production and transportation. Recently, ammonia has emerged as a key technology for the transport and use of hydrogen. Traditionally, ammonia has been targeted for removal to prevent water pollution, especially in aquatic environments. However, with the recent paradigm shift in sewage and wastewater management towards reuse and resource recovery, ammonia in sewage is now viewed as a valuable, eco-friendly resource.

In this study, the Membrane Distillation (MD) process was applied to recover ammonia from sewage, and the recovery efficiency was evaluated using a 240 L/hr bench-scale ammonia recovery system utilizing 3M Liqui-cel technology. The evaluation confirmed that the ammonia recovery efficiency increased with higher pH, temperature, and flow rate of the ammonia solution. Long-term operation demonstrated that the ammonia concentration in the recovery solution could be increased to 10,000 ppm. However, during field evaluation, scaling within the module caused blockages. This indicates that process stability must be enhanced through the development of an optimal module in future work.

Key words: Ammonia, Anaerobic digestion leachate, Field study, Membrane contactor.