

## Membrane-based dewatering processes using FO and MD for nitrogen recovery from wastewater

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Forward osmosis (FO) and biological nitrification processes were integrated. High strength ammonia wastewater was partially nitrified at an ammonia conversion rate of  $1.34 \pm 0.25$  kg-N/m<sup>3</sup>-day. The simultaneous FO process concentrated the wastewater at concentration factors (CFs) of up to 2.34 during the partial nitrification (PN) reaction. It was found that salinity higher than 17 g-TDS/L inhibited the activity of the nitrite-oxidizing bacteria, but not the ammonia-oxidizing bacteria. To concentrate the nitrogen content further, direct contact membrane distillation (DCMD) was applied. The ratio of transferred ammonia to water (i.e., specific ammonia transfer: SAT) was controlled by operational conditions of membrane materials, pH and temperature. It was identified that free ammonia (FA) concentration has a critical role on SAT values under different total ammoniacal nitrogen concentration and pH.