

Impact of temperature on the performance of hybrid MD-PRO system

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Membrane distillation (MD) and pressure retarded osmosis (PRO) are promising membrane-based processes to overcome water and energy shortage. MD produces water by temperature difference while PRO generates power by osmotic pressure difference between two solutions. Since MD and PRO processes have benefits and drawbacks, their combination (referred to as MD-PRO hybrid system) will be beneficial in terms of total energy consumption and water production. In MD-PRO hybrid system, heated MD feed solution flows into the PRO draw side after passing through the MD membrane module that causes the temperature-increase of the PRO draw solution. Since PRO is normally operated at 25°C, increased temperature of the draw solution may affect the following PRO performance. Therefore the objective of this study is to evaluate the PRO performance according to the temperature variation of PRO draw solution. The cost-effective operating condition in terms of temperature and the use of heat exchanger are also considered.

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