

The Reverse Osmosis Concentrate from Water Reuse Process and its Treatment Technologies

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ABSTRACT

The global demand for the fresh water is ever increasing. One solution can be the production of reuse water from wastewater treatment plants. To meet the strict standards for the reuse water, advanced wastewater treatment is necessary. Among the tertiary processes to produce reuse-able water, reverse osmosis has a high potential for its advantages in module construction, small carbon footprint, and requirement of relatively simple process. However this process has a problem of producing concentrate, is very detrimental to the environment if disposed without treatment.

The important characteristics of the RO concentrate are high pollutant load, such as COD, nitrogen, and phosphorus. The Advanced Oxidation Processes may be advantageous for the dissolved organic carbon, for example, ozonation, photo-catalysis, sonolysis and electrochemical oxidation. Among these technologies, electrochemical oxidation has the highest potential for the future for its highest accomplished efficiency and increased energy efficiency due to saline RO concentrate.

The RO concentrate also has potential for the future source of nutrient and salt ions. However its economic advantage must be studied. The treatability of RO concentrate has been focused on dissolved organic carbon. However, nitrogen and phosphorus concentration in the brine are also very significant and thus need to be studied extensively.

In KAIST, there are some research studies to produce reuse-able water and treat the RO concentrate. One is denitrification of the concentrate using membrane biological reactor. Another is reduction of nitrate by using nano-scale zero valent iron parties. There is also another research to understand the impact of salinity on the performance of biological process of the RO concentrate.

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