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# The comparative study for scale inhibition on surface of RO membranes in wastewater reclamation: CO<sub>2</sub> purging versus three different antiscalants

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## Abstract

The application of reverse osmosis (RO) membrane in wastewater reclamation is emerged as a potential technology. As far as the operational conditions are concerned, inorganic fouling is a major challenge for membrane treatment systems. At present various antiscalants and chemicals are commercially available for scale inhibition on the surface of membrane. In an earlier study we found that CO<sub>2</sub> can effectively inhibit scale growth on the surface of RO membrane in wastewater reclamation. On the basis of previous study, the scale inhibiting efficiency of CO<sub>2</sub> was compared with three commercially available antiscalants. The RO system was operated at constant applied pressure with four different scale inhibition methods including CO<sub>2</sub>, Flocon 260, Flocon 300 and Kuriverter N-500. The permeate flux decline was considered as an indication of scale growth on the membrane surface. The percent salt rejection and ionic mass balance was used to determine the scaling behavior of the RO modules. Membrane autopsy was done to determine the effect of CO<sub>2</sub> and antiscalants on the membrane structure. The experimental data revealed that CO<sub>2</sub> can effectively inhibit scale growth as compared with all of three antiscalants. However, the Flocon 260 was found better than other two antiscalants.

## Keywords

Antiscalant; CO<sub>2</sub>; Flux; Reverse Osmosis; Scale

## Highlights

- The comparative study for CO<sub>2</sub> and three antiscalants is presented.
- CO<sub>2</sub> purging in feed water successfully inhibited the inorganic fouling on the surface of membrane.
- The operation of RO membrane with CO<sub>2</sub> purging is proposed for the scale inhibition.

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