

July 05-07, 2018
Berlin, GermanyArch Chem Res 2018, Volume 2
DOI: 10.21767/2572-4657-C3-009

ISOLATION, IDENTIFICATION AND DIFFERENTIATION OF ANTISCALANT DEGRADING SEAWATER MICROORGANISMS USING MALDI-TOF MS AND INVESTIGATION OF THEIR INTERACTIONS WITHIN REVERSE OSMOSIS MEMBRANE SYSTEMS

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MALDI-TOF MS technique was used as a rapid and cost-effective proteomic technique to identify various microorganisms from Qatar's sea water. These microorganisms were then investigated for their ability to biodegrade different antiscalants which are used to reduce membrane scaling in SWRO. The objective of this research was to investigate the interaction between these antiscalants with sea water microbial community. Since, the biodegradation of these chemicals will reduce their efficiency to suppress membrane scaling, thereby, promoting biofouling in SWRO. The strains isolated from sea water samples collected across various locations were identified as *H. aquamarina*, *P. fragi*, *P. stutzeri*, *V. alginolyticus*, and others. Some of the isolated strains such as *H. aquamarina* showed ability to biodegrade these antiscalants. Whereas, many other strains were found to be sensitive as there was no net increase in microbial biomass (measured through optical density and

plate count method) noted in these media. Thus, it can be concluded that these antiscalants may also help in reducing the growth rates of microorganisms in RO membrane systems simultaneously reducing both membrane scaling and biofouling potential. However, the presence of a specific group of bacteria such as *H. aquamarina* may biodegrade the chemicals, thereby reducing their efficiency to minimize membrane scaling and increasing biofouling potential. Further research is on-going to investigate the ability of various microorganisms to form biofilm on RO membrane in the presence of antiscalants. The outcome of this research will help to fill several knowledge gaps and answer several research questions within the field of SWRO.

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