

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/347967814>

Characterization and Identification of Organic Molecules in Thermal Desalination Plant Scale

Article in *Desalination and Water Treatment* · December 2020

DOI: 10.5004/dwt.2020.26334

CITATIONS

0

READS

19

7 authors, including:



Troy Nolan Green

Saline Water Conversion Corporation

15 PUBLICATIONS 127 CITATIONS

[SEE PROFILE](#)



Abdelkader Meroufel

RISE Research Institutes of Sweden

31 PUBLICATIONS 265 CITATIONS

[SEE PROFILE](#)



Syed Ali

Birmingham City University

163 PUBLICATIONS 1,097 CITATIONS

[SEE PROFILE](#)

Some of the authors of this publication are also working on these related projects:



Mircobial Corrosion in SWRO desalination plant [View project](#)



Hydrogen Embrittlement - Understanding and research framework [View project](#)



Characterization and identification of organic molecules in thermal desalination plant scale

Troy N. Green^{a,*}, Nouri Hassan^b, Nagmeddin Elwaer^b, Christopher Fellows^{a,c}, Abdelkader Meroufel^a, Abdullah Al-Mayouf^b, Syed Ali^b

^aSWCC: Desalination Technologies Research Institute (DTRI), Saudi Arabia, Tel. +96613 3430333 Ext. 31715; emails: TGreen@swcc.gov.sa (T.N. Green), CMichael@swcc.gov.sa (C. Fellows), Tel. +46 730472263; email: Nabil_Wahran@hotmail.fr (A. Meroufel)

^bSABIC: Analytical Laboratories (KSA Analytical), Saudi Arabia, Tel. +96611 4999815; email: Hassannm@sabic.com (N. Hassan), Tel. +96611 4999787; email: Elwaern@sabic.com (N. Elwaer), Tel. +966114999752; email: Mayoufam@sabic.com (A. Al-Mayouf), Tel. +91 7310612158; email: Alisyed156@yahoo.com (S. Ali)

^cThe University of New England: School of Science and Technology, Australia

Received 12 November 2019; Accepted 12 July 2020

ABSTRACT

Scale samples from a 144,000 m³/d Arabian Gulf multi-stage flash (MSF) desalination plant were collected and assayed for organic, biological, and inorganic compounds. Samples were collected from the bottom side of the deaerator and the first flash chamber of a 24,000 m³/d MSF unit. For the first time, organic compounds and adenosine triphosphate were characterized and identified in both selected locations. Within predominantly calcium carbonate (in the deaerator) and magnesium hydroxide (in the first stage of MSF) scale samples, organics were detected, and their potential sources suggested based on related literature. Organic compounds found are consistent with degradation components of bacterioneuston with some contribution from species present in the seawater source and pretreatment chemicals. These findings raise the possibility of a significant role of organic compounds in alkaline scale nucleation and growth in the MSF process.

Keywords: Scale; Organics; Adenosine triphosphate (ATP); Kinetics; Calcium carbonate; Magnesium hydroxide

* Corresponding author.