Uses of *Haloarchaea* in wastewater treatments combining de-nitrification and nitrification processes

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Wastewater treatments (WWT) rely on microorganisms to perform the breakdown of sewage influent. Modern biological treatments of wastewater involve not only carbon removal but also elimination of other nutrients such as nitrogen. Although the importance of eukaryotic and bacterial organisms in these processes has long been recognized the role played by Archaea in aerobic and anaerobic WWT has received much less attention. In recent years, it is being particularly important the use of *Haloarchaea* in treatments that remove nitrogen compounds from water. The manufacture of chemicals compounds (pesticides, herbicides, explosives, etc.) usually generates effluents containing complex mixtures of salts and nitrate, nitrite or ammonium. Also, the increase of salinity in soils and waters in the last few decades has given advantage to some species like *Haloferax mediterranei*. Physiological studies focused on denitrification processes carried out with *Hfx mediterranei* have revealed that it tolerates high nitrate (up to 2 M) and nitrite (up to 50 mM) concentrations which are the highest described from a prokaryotic microorganism. Therefore it could be attractive for bioremediation applications in sewage plants where high salts, nitrate and nitrite concentrations are detected in wastewaters and brines. In a recent study, this *Haloarchaeon* was able to remove 60% of the nitrate and 75% of nitrite initially present in the brines (initial concentration was 40 mM nitrite). These results suggest that *Hfx mediterranei* and in general, *Halophilic archaea* are excellent models to explore large-scale bioremediation processes to remove nitrogen compounds from brines and wastewaters.

**Biography**

Javier Torregrosa-Crespo is currently pursuing his PhD from University of Alicante (Spain) in Biochemistry and Molecular Biology after finishing his studies in Biology. In addition, he has got experience in production of Bio-fuels working in the international company ABENGOA S.L. (Sevilla, Spain).

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