TITLE: EFFECT OF SALINITY IN HETEROTROPHIC NITRIFICATION/AEROBIC DENITRIFICATION BY BACTERIAL ISOLATES FROM EFFLUENT TREATMENT STATION

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ABSTRACT: During the process of oil extraction, a large volume of effluent is generated. This effluent contains toxic compounds such as ammonium, which, when in high concentrations can cause eutrophication in the environment, therefore, the effluent needs to be treated before being discarded. Biological treatment by activated sludge is most used because of its low cost associated with good efficiency. The biological removal of ammonium can occur by autotrophic nitrification in aerobiosis, followed by heterotrophic denitrification in anaerobiosis, where the two steps are performed by different microorganisms, or by heterotrophic nitrification/aerobic denitrification (NH/DA), where a single microorganism is capable of perform the two steps in aerobiosis being more advantageous for application in the treatment of effluents. Another component of the effluent is salt, which directly affects the metabolism of ammonium removal. Thus, the use of these NH/DA microorganisms that are more resistant to salt would be ideal for application in effluent treatment systems. The objective of this work was to evaluate the influence of salinity increase on ammonia removal by aerobic heterotrophic/denitrifying nitrifying bacterial isolates. For this purpose, 4 isolated bacterial isolates of activated sludge from effluent treatment, previously characterized as NH/DA were inoculated in specific medium (HMN) with concentrations of 0,3,6,9 and 12 gL^{-1} of NaCl and incubated for 72 hours at 150 rpm. During this period the ammonia removal was followed by colorimetric method, and the optical density by reading the absorbance at 600 nm. The analyzes were done in triplicate, and the results were submitted to ANOVA with 5% significance. The isolates were identified as: *Gordonia amicalis*, *Pseudomonas stutzeri*, *Pseudomonas balearica* and *Rhodococcus ruber*. The results showed that at 72 hours all the isolates removed 100% of the ammonia with 0 and 3 $g.L^{-1}$ of NaCl. *Pseudomonas balearica* removed approximately 50% ammonia with 6 $g.L^{-1}$ salt, while *Rhodococcus ruber* and *Pseudomonas stutzer* removed 100% with 6 $g.L^{-1}$ of NaCl. However, the most efficient isolate to remove ammonia in high salinity was *Rhodococcus ruber*, which with 9% salt, was able to remove 50% ammonia. These results were promising, since the salt concentration in the sea is around 3.5%, and these isolates, in addition to complete nitrification/denitrification, achieved high efficiency in salinities above 6%.

Keywords: Ammonium removal; Heterotrophic nitrification; Salinity.

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