

ISOLATION AND PLASMID PROFILING OF PIGMENT PRODUCING BACTERIA FROM SALT PAN ECOSYSTEM

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Abstract

Soil sample was collected from the salt pan of Tuticorin, Tamilnadu. From the collected sample, bacteria were isolated through enrichment plating technique. Five morphologically different colonies were selected from a 5% salt concentration agar plate. Among the isolated bacteria, one bacterium was found to produce the pink pigment colonies. Among the 5 isolates which were Gram stained; most of the isolates were Gram negative rod shaped except TSP3 which is found to be Gram positive and pleomorphic. Among all the isolates, TSP1, 2, 4 and 5 were found to be Gram negative rod shaped. The bacteria were identified as Halobacterium sp., Pseudomonas sp., Bacillus sp., Escherichia coli, and Micrococcus sp. Plasmids were isolated from all the cultures and directly from samples. Under submerged LB broth the pH supports the growth and determines pigmentation on liquid medium. Out of 5 pH only 6 and 8 have concentrated pigmentation. Both the intracellular and extracellular pigments purified and maximum recovery of pigment was noted on the intracellular. Both extracted pigments have antibacterial effects on P. aeruginosa but activity varies among them due to concentration. Pigments are characterized by ninhydrin which denotes the presence of primary amines on the pigment and further confirmed by the FTIR spectrum. The pigment FTIR reflects prodigiosin like characters. The pigment incorporated gels have significant anti-oxidant and anti-inflammatory effects equal to standard drugs. Presence of 12 Kbp size plasmid was detected from the sample and not found in any one of the culturable isolates. Further, plasmid profiling among isolates and Metaplasmid shows the presence of different sizes of plasmid which are absent in culturable bacteria. PCR amplicon of Chromosomal DNA of pigmented bacteria reveals the culturable bacteria belong to Halobacterium sp. The present study concludes that the Halobacterium sp produced pigment has potent medicinal value which can act as antibacterial, antioxidant and anti-inflammatory agent followed by toxicity evaluation.

Keywords: Salt tolerance, Plasmid profiling, Metagenome, Halobacterium sp.

1. INTRODUCTION

Extremophiles research is crucial for improving the extraction of novel chemicals and exploring potential biomedical applications. The hyper saline habitats will favor the microbial species which are complex in their composition and nature. Microbes living at high salt concentrations are extremely diverse. Halophiles are present in diverse habitats including the most noxious environments on the planet. Halophilic microbes flourish in generally shifting centralizations of NaCl going from (0.2 – 5.1M or 2 – 30%).

Based on this shifting NaCl focus, halophiles are classified as slight, moderate and outrageous halophiles. Halophilic microorganisms play a vital role in the production of many enzymes and bioactive compounds.

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