

عنوان مقاله:

Biochemical Detection of N-Acyl Homoserine Lactone from Biofilm-Forming Uropathogenic Escherichia coli Isolated from Urinary Tract Infection Samples

محل انتشار:

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خلاصه مقاله:

Background: N-Acyl homoserine lactone (AHL) is found to be the main component of quorum sensing (QS) in Gram-negative bacteria and plays an important role in biofilm formation. Little information is available regarding the role of AHL in biofilm formation in Escherichia coli (E. coli). The purpose of this investigation was to biochemically detect and characterize AHL activity in biofilm-forming uropathogenic E. coli (UPEC) isolated from urine samples of the patients with urinary tract infections (UTIs) in Kerman, Iran. Methods: Thirty-five UPEC isolates were obtained from urine samples of the patients with UTIs referred to the Afzalipoor hospital. The isolates were identified by biochemical tests. Biofilm analyses of all the isolates were performed using the microtiter plate method at OD 490nm. N-Acyl homoserine lactone was separated from cell mass supernatants by liquid-liquid extraction (LLE) and analyzed by a colorimetric method. N-Acyl homoserine lactone functional groups were identified by Fourier Transform-Infrared Spectroscopy (FT-IR). Results: The biofilm formation assay identified 10 (28.57%) isolates with strong, 16 (45.71%) with moderate, and 9 (25.71%) with weak biofilm activities. The UPEC isolates with strong and weak biofilm activities were subjected to AHL analyses. It was found that isolates with the highest AHL activities also exhibited strong adherence to microplate wells ($P \leq 0.05$). Two E. coli isolates with the highest AHL activities were selected for FT-IR spectroscopy. Peaks at 1764.33, 1377.99, and 1242.90 cm^{-1} correspond to the C=O bond of the lactone ring, and the N=H and C-O bonds of the acyl chain, respectively. Conclusion: We found that many UPEC isolates exhibited strong biofilm formation. The control of this property by AHL may contribute to the pathogenesis of the organism in UTI's

کلمات کلیدی:

Biofilm, FT-IR, N-acylhomoserine lactone, Uropathogenic Escherichia coli

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