

ABSTRACT

A study was done to determine the presence of degradation activity of heterocyclic hydrocarbon compounds in marine bacteria isolated from seawater of Sarawak coastline. Four isolates of marine bacteria that capable of utilizing three heterocyclic hydrocarbon compounds, which were biphenyl, dibenzothiophene and carbazole as the sole source of carbon and energy for bacterial growth were isolated from three different sites in coast of Sarawak which were Muara Tebas, Sematan, Miri area and designated as MT, SEM, M, respectively. One isolate from MT, designated as MT02 showed positive utilization of dibenzothiophene. Two isolates from SEM, designated as SEM01 and SEM02, showed positive utilization of biphenyl and dibenzothiophene, respectively, and one isolate from M, designated as M02 showed positive utilization of carbazole. All four isolates were characterized biochemically and genetically by 16S ribosomal DNA sequence where MT02, SEM01, SEM02 and M02 were identified as *Thalassospira xiamenensis*, *Chromohalobacter marismortui*, *Pseudomonas stutzeri* and *Thalassospira profundimaris*, respectively. Phylogenetic analysis was constructed to reveal the relationships of these bacteria isolates with other known and reported heterocyclic compounds degrading bacteria. The degradative genes of carbazole were isolated and analyzed by polymerase chain reaction (PCR) with the designed primers. Analysis showed that the bacterium was identified as *Lysobacter* sp. OC7.

Keywords: Marine bacteria, heterocyclic hydrocarbon compounds, degradation activity, degradative genes

Penilaian Sebatian Hidrokarbon Heterosiklik, Khususnya Sebatian Karbazol oleh Thalassospira xiamenensis, Chromohalobacter marismortui, Pseudomonas stutzeri dan Thalassospira profundimaris Dipencil dari Pantai Sarawak, Malaysia

ABSTRAK

Satu kajian telah dijalankan untuk menentukan degradasi sebatian hidrokarbon heterosiklik oleh bakteria marin yang dipencilkan dari pantai Sarawak. Empat pencilan bakteria marin yang berupaya untuk menguraikan tiga jenis sebatian hidrakerbon heterosiklik iaitu bifenil, dimetildopina dan karbazol telah dipencilkan dari tiga kawasan berlainan di pantai Sarawak dan dikodkan sebagai MT, SEM dan M selaras dengan kawasan Muara Tebas, Sematan dan Miri. Satu pencilan bakteria dari MT, yang dikodkan MT02 menunjukkan keupayaan untuk menguraikan dimetildopina. Dua pencilan bakteria dari SEM dikodkan SEM01 dan SEM02 menunjukkan keupayaan untuk menguraikan bifenil dan dimetildopina. Dan satu pencilan bakteria dari M dikodkan M02 menunjukkan keupayaan untuk menguraikan karbazol. Semua empat pencilan, MT02, SEM01, SEM02 dan M02 telah ditentukan identitinya dan dikenal pasti sebagai Thalassospira xiamenensis, Chromohalobacter marismortui, Pseudomonas stutzeri dan Thalassospira profundimaris. Analisis filogenetik telah mendedahkan hubungan bakteria yang telah dipencilkan bersama dengan bakteria yang telah dilaporkan mampu menggunakan sebatian hidrakerbon heterosiklik. Gen penurun daripada karbazol telah diasingkan dan dianalisis secara reaksi berantai polimerase dengan menggunakan primer yang direka. Analisis menunjukkan bakteria telah dikenal pasti sebagai Lysobacter sp. OC7.

Kata kunci: Bakteria marin, sebatian hidrokarbon heterosiklik, aktiviti penguraian, gen penurun