

SHORT COMMUNICATION

RARE ACTINOMYCETES IN MANGROVE SOILS AND LEAF LITTER

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Abstrak: Aktinomiset merupakan satu daripada sumber utama dalam penemuan bahan-bahan bioaktif yang baru. Sejumlah 226 pencilan aktinomiset telah dipencilkan daripada sampel tanah dan daun gugur yang terkumpul di hutan bakau di Morib, Malaysia. Populasi aktinomiset dalam sampel-sampel tersebut adalah dalam jangkakan 6.0×10^2 hingga 20.0×10^2 cfu/g sampel kering. Perbezaan dalam jumlah populasi dan taburan aktinomiset adalah bererti mengikut jenis sampel paya bakau. Kepelbagaian atau diversiti aktinomiset dalam sampel tanah dan daun gugur secara tentatif merangkumi *Micromonospora*, 49%; *Streptosporangium*, 17%; *Streptomyces*, 7%; *Actinomadura*, 4%; *Saccharomonospora*, 2%; dan lain-lain (*Microbispora*, *Nocardia*, *Dactylosporangium* dan *Actinoplanes*), 20%. *Micromonospora* dan *Streptosporangium* adalah dua genus utama yang didapati dalam sampel-sampel tersebut. Sejumlah 72 pencilan telah dipilih untuk pencirian berdasar variasi dalam morfologi koloni dan warna miselium yang terhasil dalam piring pemencilan. Daripada jumlah pencilan tersebut, 33 pencilan (46%) menghasilkan miselium udara dan 13 pencilan (18%) menghasilkan pelbagai pigmen terlarut dalam agar MMS. Manakala 33 pencilan (46%) mengandungi asid meso-diaminopimelik (DAP) dalam hidrolisat dinding sel.

Abstract: Actinomycetes are one of the major sources for the discovery of novel bioactive compounds. A total of 226 actinomycete strains were isolated from Morib mangrove soils and leaf litter samples in Malaysia. The actinomycete populations ranged from 6.0×10^2 to 20.0×10^2 colony-forming units (cfu)/g dry sample. Total populations and tentative distributions of actinomycetes varied significantly with the different types of mangrove samples. The tentative genus diversity in mangrove soil and leaf litter was *Micromonospora*, 49%; *Streptosporangium*, 17%; *Streptomyces*, 7%; *Actinomadura*, 4%; *Saccharomonospora*, 2% and others (*Microbispora*, *Nocardia*, *Dactylosporangium* and *Actinoplanes*), 20%. *Micromonospora* and *Streptosporangium* were the dominant genus observed in mangrove rhizosphere soil and leaf litter samples. A total of 72 different isolates were selected based on variation of colony morphology and mycelial colour on the isolation agar plate for characterization. Thirty three (46%) isolates produced aerial mycelium and 13 (18%) isolates produced a range of diffusible pigments on MMS agar plates. Meso-diaminopimelic acid (DAP) isomer was observed in 33 (46%) isolates.

INTRODUCTION

Actinomycetes are an important group of gram-positive filamentous bacteria, not only as degraders of organic matter in the natural environment, but also as producers of antibiotics and other useful compounds of commercial interest (Hayakawa & Nonomura 1987). Almost none have addressed the actinomycete population in mangrove soil and leaf litter, except for the study of Nakagaito and Hasegawa (1991), and Hatano (1997).

However, recent research with the Malaysian mangrove mud, mangrove rhizosphere, near shore sediments, soft coral, seaweed and sponge samples have

been revealed tentative actinomycete diversity and their bioactivity (Vikineswary *et al.* 1997; Ismet *et al.* 2002; Tan *et al.* 2002; Ismet 2003). Based on the above studies, the Malaysian mangrove rhizosphere environment may be a source of novel and possibly new actinomycetes yet to be explored.

The successful isolation and enumeration of actinomycetes from soil are usually achieved by the dilution plate technique using pretreatment, selective media containing selective nutrients and antibiotics. Humic acid-vitamin (HV) agar was used selectively for the isolation of varieties of rare actinomycetes from soil. The pretreatment of soil suspension in YE-

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