

**UNIVERSITI TEKNOLOGI MARA**

**BIOACTIVE MICROBIAL METABOLITES  
FROM MALAYSIAN RAINFOREST SOIL  
FUNGI AS A SOURCE OF NEW DRUGS  
CANDIDATES**

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## ABSTRACT

Fungi isolated from soil are sources of a wide range of bioactive natural products that can be exploited as antibacterial, antifungal and antitumor drugs. In the present study, chemical treatment is used to allow the selection of a more manageable number of isolates. Twelve soil samples collected from Sungkai (Perak), Pangkor (Perak) and National Park (Pahang) were treated with phenol. As a result, 91 fungal strains resistant to that toxic compound were isolated and grown on potato dextrose and malt extract agar media for 14 days at 28°C and 37°C. The pure cultures were extracted with ethyl acetate using an extraction procedure that was developed in this study. A qualitative HPLC method was developed for multiple-analyte analyses which provided sharp and symmetrical peaks. Aliquots of each extract were injected into reverse phase mode HPLC system and their chromatographic profiles were recorded. All crude extracts (10 mg/mL) were subjected to screening for antimicrobial activity. Twelve active crude extracts (1 mg/mL) then underwent disc diffusion assay against bacteria (*Bacillus subtilis* ATCC 6633, *Escherichia coli* ATCC 25922, *Staphylococcus aureus* ATCC 6538, *Pseudomonas aeruginosa* ATCC 27853) and fungi (*Candida albicans* ATCC 10231 and *Aspergillus niger* ATCC 16404) at a dose of 10 µg/disc. In particular, extract SHSF showed remarkable antimicrobial activity with inhibition of almost all target organisms except *E. coli*. The zones of inhibition of extract SHSF ranged from 4 to 19 mm. The activity was similar to that of gentamicin (19 mm) when tested against *B. subtilis*. Extracts showing significant antimicrobial activity (SHSF, SHSB, SHSL, and SHSQ) were then subjected to HPLC fractionation. 46 of 0.5-mL fractions of each extract were collected and dried under reduced pressure. The resulting fractions were tested for their antimicrobial activity. Four fractions of SHSF showed more than 90% growth inhibition against *C. albicans* and *A. niger*. Some fractions from SHSB, SHSL and SHSQ showed growth inhibition of 80% to 90% against *C. albicans* and *A. niger*. Characterization of fungi SHSL and SHSF by a molecular approach showed that SHSL was 100% similar to *Penicillium citrinum* and SHSF was 100% identical to *Aspergillus longivesica*, a rare fungus isolated in 1971 from a Nigerian rainforest soil sample.

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