Research in Pharmaceutical Sciences, 2012;7(5)
School of Pharmacy and Pharmaceutical Sciences
Isfahan University of Medical Sciences

Isolation and characterization of antibacterial producing actinomycetes from soil samples of Fars province, Iran

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Background and Aims: Streptomyces species are Gram-positive bacteria which generate about 75% of commercially produced and medically useful antimicrobial agents. Although thousands of antibiotics have been isolated from Streptomyces, these represent only a small portion of the repertoire of bioactive compounds produced. Hence, isolation of new Streptomyces species from natural resources and characterization of their secondary metabolites is a valuable attempt. In this study, we tried to find a new antimicrobial agent from soil to control the problem of multiple drug resistance bacteria.

Methods: Twenty three of Streptomyces isolates capable to produce antibiotic were isolated from different farmland area in Fars province, Iran. The cross-streak method against the most resistant standard bacteria was carried out as a preliminary screening procedure. The characterization of isolates were performed using 16s rDNA sequencing followed by biochemical tests. The most potent isolates were selected and their extracts were screened for their antimicrobial activity using Kirby-Bauer disc diffusion disk. The antimicrobial agent of these isolated were then assessed using GC-MS.

Results: Findings showed that seven isolates are active against at least 2 of the test organisms. These seven isolates were then opted for further antimicrobial activity tests. These antimicrobial substances revealed thermal resistance for up to 85°C and partially resistance to treatment with trichloroacetic acid. The GC-MS data analysis showed that antibiotic profile of these isolates had an unusual antibiotic profile as compared to available antibiotics.

Conclusions: The outcomes of the present research emphasized their potentials as a resource of novel antibiotics. Therefore, they are optimistic options to deserve further purification, characterization and separation of the active metabolites from them for ongoing growing of resistant bacteria.

Keywords: Antibiotic; Antimicrobial agents; Antimicrobial activity; Streptomyces