

Identification of soil isolated actinomycetes with inhibitory effect on bacterial and fungal pathogens by 16S rDNA technique

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Background and Aims: The aim of the present study was to evaluate antibacterial and antifungal activity of soil isolated actinomycetes followed by identification using biochemical properties and 16S rDNA technique.

Methods: After collecting soil samples from various parts of Kerman the soil extracts was spread on agar plate containing test bacterial and fungal strains. After incubation for a desired time, actinomycetes with inhibition zones were isolated. Thereafter, macroscopic and microscopic observations as well as biochemical tests were performed to identify the isolated actinomycetes. The sequence of 16S rDNA gene was then amplified using actinomycete specific primer and then the BLAST program was used to comprise the obtained sequences.

Results: out of the 5 actinomycetes isolates the isolated D5 exhibited inhibitory activity zone on *Staphylococcus aureus* (20 mm) *Escheriachia coli* (20 mm) *Pseudomonas aeruginosa* (13 mm) *Salmonella typhi* (23 mm) *Candida albicans* (15) and *Candida dubliniensis* (15 mm) *Aspergillus niger* (13 mm). Other 4 isolated actinomycetes showed inhibitory activity on tested microorganisms. The macroscopic characteristics of isolated strains showed similarity to common actinomycetes. All Gram positive isolated actinomycetes hydrolyzed starch and reduced nitrate. Strain D2, D3 and D5 showed casein hydrolyzing ability. MR-VP test of all strains were found to be negative. All strains were able to liquefy gelatin except for strain D5. The catalase and oxidase tests of all strains were negative. Comparison of 16S rDNA gene with recorded genes of NCBI GenBank revealed similarity to other actinomycetes.

Conclusions: Five actinomycetes with inhibitory effect on bacterial and fungal pathogens were introduced in the present study among which isolate D5 showed highest activity on both Gram positive and Gram negative bacterial strains as well as fungal pathogens.

Keywords: Actinomycetes; 16S rDNA; Antibacterial activity; Antifungal activity