

Isolation and Antimicrobial Activity of a Rare *Actinobacteria* from Gülbahçe Bay, Aegean Sea

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Aim of the study: Marine environments present a rich source for microorganisms and harbour rare species. These microorganisms may produce different metabolites from terrestrial counterparts. The aim of this study was to investigate the presence of slow growing rare actinobacteria from sediment samples and determine their antimicrobial activities.

Material and Methods: A marine sediment sample was collected by SCUBA diving at 15m depth from Gülbahçe Bay, Aegean Sea in September 2016. The sample was collected in a 120 ml sterile plastic Whirl-Pak bag. The sample was brought to the laboratory in cold box at the same day and subjected to three different pre-treatment prior to inoculation in order to eliminate the fast growing Gram negative bacteria. Nutrient rich sediment extract agar (NRS) used for isolation of the rare actinobacteria strains. Plates were incubated in a humidified atmosphere at 28°C for up to 6 weeks. The strain 13651S was isolated after 4 weeks incubation and subjected to fed-batch fermentation. Erlenmeyer flasks containing Seawater-based M1 medium (50 ml) were inoculated with the organism and incubated at 25°C for 15 days at 150 rpm. Cell-free fermentation broths were extracted with ethyl acetate and the extracts were tested for their antimicrobial activities against a panel of test microorganisms using disc diffusion assay. The isolate was also identified using 16SrDNA sequence analysis.

Results: *Streptomyces* strain 13651S was isolated from the marine sediment collected from Gülbahçe bay (İzmir Gulf, Aegean Sea) at the 5th week. The strain was identified as *Streptomyces aculeolatus* with the 16SrDNA sequence analysis. The isolate was tested for its antimicrobial activity against 6 antibiotic resistant test organisms and found active against 4 of them. The activities were as follows; *Enterococcus faecium* 34 mm, *Staphylococcus aureus* 19 mm, *Candida albicans* 9 mm and *Bacillus cereus* 8 mm. The extract didn't show any activity against *Escherichia coli* 0157:H7 and *Pseudomonas aeruginosa*. According to the best of our knowledge a marine derived *Streptomyces aculeolatus* strain was isolated from Aegean Sea for the first time and showed strong activity against Gram positive bacteria. This study also demonstrates the

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Keywords: Rare actinobacteria, *Streptomyces aculeolatus*, marine sediment, antimicrobial activity, 16SrDNA.