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Xylanase Production of the Marine Derived Fungal Strains Isolated from Coastal Areas in Turkey

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Aim of the study: In recent years bioprospecting studies are heading toward to marine derived microorganisms. The aim of this study was to investigate the xylanase production capacities of 88 marine-derived filamentous fungal strains previously isolated and identified from sediment and sponge samples collected from Aegean and Mediterranean coastal regions of Anatolian Peninsula that have a high biodiversity.

Material and Methods: A total of 88 marine-derived filamentous fungal (MDF) strains isolated from 31 sediments and 57 sponge samples which are collected from six different locations in Aegean Sea and Mediterranean coastal sides were used in the study. A semi quantitative assay was conducted in order to assess the extracellular xylanase activity of the MDF isolates in the modified Wickerham's medium. Extracellular xylanase activities were characterized by the development of a blue zone surrounding the fungal colony. Xylanase activities of the selected strains were also determined quantitatively in the fermentation broth. One unit of enzyme activity was defined as the amount of enzyme required to release 1 µmol of reducing sugars from the substrate in 1 min. One of the best of xylanase producing strains was chosen for enzyme characterization studies. The crude enzyme was partially purified using ammonium sulphate precipitation and dialysis for 24 h. Partially purified enzyme was used in the characterization studies to determine optimum pH, optimum temperature thermal stability, pH stability, the effect of organic solvents, metal ions and denaturants.

Results: Isolates were screened for their extracellular xylanolytic activities and 81 of the 88 (92%) isolates presented activity on the solid medium. Presence of salinity in the fermentation medium increased the specific activity up to 6.66 fold on *T. pleuroticola* 08ÇK001.One of the best of four xylanase producing strains was chosen for further studies considering their specific activity, potential pathogenicity and mycotoxigenicities based on the literature data. *Trichoderma pleuroticola* 08ÇK001 xylanase was further characterized. Optimum pH and temperature was determined as 5.0 and 50°C respectively. The enzyme retained 53% of its activity at pH 5.0 after 1 h and have found resistant against several substance such as K^+, Ba^{2+}, Na^+, β-mercaptoethanol, Triton X-100 and toluene. Based on the results of the present study, MDF provides an important source for bioprospecting studies and T. pleuroticola 08ÇK001 xylanase could be efficiently used in industry regarding to its general characteristics.

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Keywords: Xylanase, marine derived fungi, *Trichoderma pleuroticola*, sediment, Mediterranean.