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Xylanase and laccase enzyme activities from new thermophilic strains of *Anoxybacillus* and *Streptomyces* species

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Lignocellulosic biomass is of very high interest in the production of bioenergy. Conversion of lignocellulosic biomass to simple sugars such as glucose and xylose, the first step in the utilization of lignocellulosic biomass is a complex process. Many studies have focused on the conversion of lignocellulosic biomass to simple sugars using microbial enzymes. Several recent studies have focused on identifying efficient lignocellulose-degrading enzymes from thermotolerant bacteria because of the superior stability of their proteins. Our lab has recently isolated new thermophilic strain of *Streptomyces* sp., and *Anoxybacillus* sp., which can grow on mineral salts culture media containing xylan, cellobiose, cellulose, or lignin as the sole carbon sources. Characterization of the lignocellulose-degrading enzyme activities of the organisms is presented. The organisms were identified as *Streptomyces* sp. and *Anoxybacillus* sp. using 16S rDNA sequencing. For testing enzyme activities, both organisms were grown in defined mineral salts media containing either crystalline cellulose, CMC, xylan, orlignin and incubated in a rotary shaking incubator at 55 °C for 120 hours. After 120 hours, a crude enzyme extract was obtained, concentrated using ultrafiltration with 9K MWCO membrane and tested for enzyme activities (xylanase, cellulase and laccase). For cellulase and xylanase enzyme assays the 2-cyanoacetamide method was used and it was found that *Streptomyces* sp. had maximum xylanase activity while *Anoxybacillus* sp., showed laccase activity using the congo-red decolorization method. Both enzyme activities were further characterized in terms of their optimal pH and temperature and it was observed that the maximum xylanase activity was at 70 °C and pH 6, while the optimal conditions for laccase activity were 90 °C and pH 9.

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