Available online at **www.joac.info**

ISSN: 2278-1862

Journal of Applicable Chemistry

2019, 8 (4): 1858-1869

(International Peer Reviewed Journal)

Biomass Utilization of Burma Reed (*Neyraudia reynaudiana*) by an Alkaliphilic cellulase free Xylanase Producing *Saccharopolys pora antimicrobica* strain 20-23

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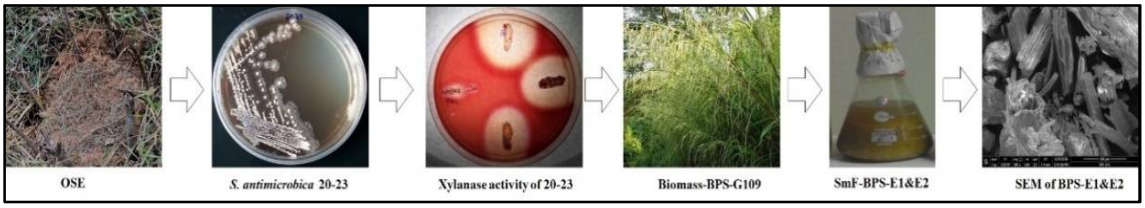
Accepted on 2nd June, 2019

ABSTRACT

On the behest of isolating hemicellulose degrading actinobacteria from sub-tropical forest ecosystem, an on-site enrichment system (OSE) was designed comprising of naturally occurring plant materials which were successful in isolating eight xylanase producers, with 57% overall bacterial recovery. These xylanase producers belonged to Streptomyces, Saccharopolys pora and Nocardiopsis genera of which isolate 20-23 (Saccharopoly spora antimicrobica) exhibited the highest xylanase activity of 39.88±0.42U mL^{-1} at 6th day, pH 8 and 30°C.S. antimicrobica 20-23 (BPS-E1 and E2) potential to utilize BPS-D1 the lignin devoid thermo-alkali pre-treated Burma reed (Neyraudia reynaudiana BPS-G109), for its hemicellulose hydrolysis yielded optimal xylanase activity 47.70 ± 0.31 U mL^{-1} on the 6th day itself. BPS-E1 and E2 submerged fermentation (SmF) was successful in utilizing the 90% of total hemicellulose, resulting in enhanced cellulose recovery (38% to 76%). This result was substantiated by the lack of characteristic hemicellulose peaks by Fourier-transform infrared spectroscopy (FTIR) analysis and subsequent cellulose gain as indicated by increased crystallinity by X-ray powder diffraction (XRD) analysis. To the best of our knowledge, it is for the first time Saccharopolyspora antimicrobica strain 20-23 was exploited for its alkaliphilic cellulase free xylanase productivity was successfully implemented for hemicellulose utilization of Neyraudia reynaudiana for enhanced cellulose recovery.

Graphical Abstract



Keywords: Xylanase, enrichment, *Saccharopolyspora antimicrobica*, OSE.