# Utilization of Waste Paper and Lignocellulosic Pulps for Production of Cellulases, β-Glucosidases and Xylanases by Penicillium Funiculosum

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**ABSTRACT**

In this study the production of cellulases, β-glucosidases and xylanases was investigated in two fungi obtained from NRRL *Penicillium funiculosum* 3647 and *Trichoderma viride* 6198, using different carbon source in the medium as pretreated rice straw, cotton linter and newspaper under shake-culture conditions at 30°C, *P. funiculosum* has been found to produce moderately good enzymes when growing on Dox medium supplemented with (1% w/v) pretreated rice straw and cotton linter for 4 days and had an optimum pH and temperature ranging between pH 3.5-5.0 and 50°C respectively, and air: medium 4:1, the enzyme is not stable at temperature of up to 50°C and rapidly decreased,

While *T. viride* have poor activity that was observed when grown alone.

On mixed *P. funiculosum T. viride* together through cultivation caused a significant decrease in the levels of cellulase, β-glucosidases and xylanases enzymes. It is clear that treatment of lignocellulosic by fungi enhanced the bleachability and reduced kappa no. Also degree of polymerization was highly increased. IR and scanning electron microscope were studied.

**Key Words:** *P. funiculosum* 3647; *T. viride* 6198; celluloses; β-glucosidase; xylanases; rice straw; cotton lint and newspaper.