EXECUTIVE SUMMARY

Project Title : **Isolation and characterization of Lignocellulolytic enzymes from Bacterial and Fungal fermented Rice straw and husk**

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The present study was undertaken keeping in mind the problems of agro-industrial waste management and also the production of value added products such as lignocellulolytic enzymes through solid state fermentation (SSF) by bacteria *Bacillus sps.* and fungus *Aspergillus niger*. The raw material used was rice straw and husk. In the present study *Aspergillus niger* showed maximum cellulase, peroxidase and xylanase activities in solid state fermentation of the materials used.

The production of cellulase was maximum at 21st day of fermentation at 1.70 U/µl, whereas the maximum xylanase and peroxidase activities were seen on 28th day of fermentation at 0.51 U/µl and 1.78 U/µl respectively. It was also concluded from the present study is that a pH ranging from 4.0 – 6.0 and temperature at 35^{0}C were required for the effective production of lignocellulolytic enzymes. The activity of *Bacillus sps* under different conditions such as particle size, incubation time, incubation temperature and pH of the medium was less compared to the fungus *Aspergillus niger* used for the degradation of both rice husk and straw.

Thus the result of the present study indicates that *Aspergillus niger* was capable of quick degradation of lignocellulosic polysaccharides ensuring carbon and energy source for the fungal mycelia for both their vegetative and reproductive function. The results of this study indicated that by the selection of appropriate growth substrate and mode of fungal cultivation, it is possible to highly increase the secretion of all enzymes compared to the bacterial species selected for the study. *Aspergillus niger* was found to be a promising producer of laccase and peroxidase enzymes. Our study also showed that Solid state fermentation (SSF) of plant substrates is favourable procedure for peroxidase, laccase and xylanase secretion.