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Biodegradation of cotton stalks for protein-rich feed production by co-cultivation of *Pleurotus ostreatus* and *Azospirillum brasilense* grown on solid state fermentation

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The alarming rate of population growth has increased the demand for food production leading to a yawning gap in demand and supply. The rapid growth, high protein content of microbes and their ability to utilize waste feed stocks have made microorganisms the prime candidates for use as animal feed protein supplement. Crop residues are generated in huge quantities every year, creating disposal problems. The potential of co-cultivation of *Pleurotus ostreatus* and *Azospirillum brasilense*, and evaluation of cotton stalks waste were studied. Solid state fermentation (SSF) was carried out for 5, 10, and 15 days at 30°C. Crude protein, cellulose, hemicellulose, lignin, and in vitro dry matter digestibility were analyzed. Activities of ligninolytic enzymes were determined. The lignin, hemicellulose, and cellulose in untreated substrate were 23, 27, and 40%, respectively. Co-cultivation resulted in the degradation of 20% lignin, 15% hemicellulose, and 17% cellulose. *P. ostreatus* degrades lignocellulose with obvious selectivity for lignin. The degradation by-products of *P. ostreatus* was metabolized by *A. brasilense*, leading to more extensive synergistic use of lignocellulosics, which reflects on the enhancement of lignin degradation as well as increased laccase and peroxidase activities. The crude protein content of the fermented cotton stalks was 15%. Extensive study of single cell protein production for bridging the gap between demand and supply is a major step in this direction.

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