

Bioprocessing of lignocellulosic residues to enhance their nutritive value and production of lignocellulolytic enzymes

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Solid state bioprocessing of agricultural residues has got the potential to improve their quality to be used as animal feed and seems to be an effective method of solid waste disposal. White rot fungi were selected to degrade wheat straw under solid state conditions and to study their lignocellulolytic enzyme production. *In vitro* digestibility, crude protein, amino acids, total phenolic contents and antioxidant properties were also evaluated after degradation, which showed a significant enhancement in overall nutritive value of the degraded biomass. Best conditions for ligninolysis, enzyme production and *in vitro* digestibility were established using response surface methodology. *Phlebia brevispora* and *Phlebia floridensis* were used to upscale the degradation process under optimized conditions. An enhancement upto 60% (from 17.2 to 27.5 g/kg) in the digestibility of degraded wheat straw was achieved after 20 days. Increase in crude protein content (1.3 fold), amino acids (3 fold), total phenolic contents (5 fold) and antioxidant properties (2 fold) were also achieved. Lignin was selectively degraded upto 30% with a limited loss of 11-12% in total organic matter. Enhanced nutritive value of degraded biomass emphasized by its higher protein content, antioxidant properties and reduced level of fortification during the preparation of animal feeds, thereby reducing the cost of production. The work is an effort to provide an eco-friendly system to convert agricultural waste into nutritive animal feed with additional benefit of lignocellulolytic enzyme production.

Biography

Rakesh Kumar Sharma has completed his Ph.D. in Microbiology from Guru Nanak Dev University, Amritsar and currently working as UGC-DSK Postdoctoral fellow in the Dept of Microbiology, The M S University, Vadodara. He has published about 12 papers in internationally reputed journals and has been awarded and appreciated for his work. Prof. D. S. Arora guided the Ph.D. work and is actively associated with teaching and research work in the Dept of microbiology, Guru Nanak Dev University, Amritsar for last 30 years. He has guided 10 Ph.D. theses and published more than 70 papers in international journals. He has been awarded by many national awards for his excellence in research.

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