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Mycotechnology of ligninolytic fungi and improvement of animal feed nutrition

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Mycotechnology is an application of the fungal system to develop and explore various eco-friendly strategies for the ultimate welfare of the human society. Fungi as natural scavengers play an important role in the environment, not only in degrading various toxic pollutants, dyes and pesticides etc. but also play a much significant role in the bioconversion of agro waste biomass into useful products. The hyphal organization and well developed extracellular enzymatic system give these organisms an edge over other organisms such as bacteria. Among the different group of wood-degrading fungi such as soft rot, brown rot, and white rot; the white rot fungi are the most efficient and effective ligninolytic enzyme producers. The selective delignification ability of some of these impart them the utmost importance for various biotechnological applications such as Biopulping, biobleaching, treatment of wastewaters and dye rich effluents, desulfurization of fossil fuels, biosolublization of coal, degradation of herbicides, the potential soil pollutants, food treatment, medicinal applications, immunochemical applications and lignocellulose degradation. Enzymatic treatment holds a potential to replace/supplement the use of environment polluting toxic chemicals in pulp and paper industries, and dyes containing effluents of textile industries. Fungal based biodelignification has been best explored recently for the treatment of agro-residues for enhancing the digestibility and nutritional value of the animal feed for ruminants. Processed lignocellulosic biomass possesses improved digestibility, increased protein, and antioxidant levels, which serves as a better animal feed. The selective white rot fungi have been utilized for improving the yield of digestive components of animal feed (i.e. wheat and paddy straw). The lab scale designing of solid state fermentation bioreactor resulted in enhanced digestibility of the wheat straw by 60% and paddy straw by 40%. The enhanced nutritional value of the feed using Phlebia spp. indicate that the white rot fungi can be considered as a biotechnological alternative not only for the better health of livestock but for human health too.

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