

# 13<sup>th</sup> International Veterinary Congress

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## Role of lignocellulolytic fungus in dairy waste management through composting

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Waste management means to get rid of all the useless matter in a sustainable manner. In a dairy farm, the majority of organic wastes are likely to be cattle dung combined with spoiled hay and feed, and animal bedding (which is made up of rice or wheat straw, corncob, wood shavings etc.). These wastes can be utilized in many ways. One such way is to prepare compost from these organic wastes, converting them to something beneficial. Organic waste that is also known as lignocellulose waste, is a combination of cellulose, hemicelluloses and lignin present in varying concentration in different organic wastes. Composting is a sustainable waste management practice that converts a large volume of accumulated organic waste into a usable product. When organic wastes are broken down by microorganisms in a heat-generating process, waste volume is reduced by almost 50%. Many harmful organisms including pathogens and weed seeds are destroyed, and a useful, potentially marketable product is produced. Composting involves a consortium of microflora ranging from mesophilic to thermophilic. They include different species of bacteria, fungi and actinomycetes. Among these three categories of microorganisms, fungi are better degraders of lignocellulose wastes as fungal enzymes are generally complete comprising all the lignocellulosic activities. In this study a lignocellulolytic fungi, SMT2 was isolated from soil samples collected from wheat fields of CCS Haryana Agricultural University, Hisar (29.1504° N, 75.7057° E). Its physical conditions like temperature, pH, incubation periods and aeration conditions were optimized for production of lignocellulose degrading enzymes; laccase, lignin peroxidase, manganese peroxidase, carboxy methyl cellulase and filter paper degrading activities. The fungi grew well and conferred maximum enzyme activities at 30°C temperature, on 7<sup>th</sup> day of the incubation, at stationary conditions and at pH 6. In optimum conditions, different enzyme activities observed for SMT2 was 0.082 IU ml<sup>-1</sup> FPase, 0.032 IU ml<sup>-1</sup> CMCase, 2.5 IU ml<sup>-1</sup> Lac, 13.5 IU ml<sup>-1</sup> LiP and 1 IU ml<sup>-1</sup> MnP. The fungus' ability to degrade corn cob was measured by calculating loss in Total Organic Matter (TOM) content and cell wall composition at different days of incubation. After 30 days of incubation, loss in TOM was 60.48% and final cell wall composition was 17, 31 and 10% cellulose, hemicelluloses and lignin respectively. This signifies that this fungus can be used along with other microbes to prepare compost from dairy waste products.

### Recent Publications

1. Atuhaire A M, Kabi F, Okello S, Mugerwa S and Ebong C (2016) Optimizing bio-physical conditions and pre-treatment options for breaking lignin barrier of maize stover feed using white rot fungi. *Animal Nutrition* 2:361-369.
2. Kaur A and Phutela UG (2017) Quantitative screening of lignocellulose degrading fungi using digested biogas slurry as a substrate. *International Journal of Current Microbiology and Applied Sciences* 6(3):1355-1363.
3. Sharma D, Garlapati V K and Goel G (2016) Bioprocessing of wheat bran for the production of lignocellulolytic enzyme cocktail by *Cotyledia pannosa* under submerged conditions. *Bioengineered* 7(2):88-97.
4. Parani K and Eyini M (2012) Biodegradation of coffee pulp waste by different fungal associations. *Bioscience Discovery* 3:222 -228.
5. Charitha Devi M and Kumar M S (2012) Isolation and screening of lignocellulose hydrolytic saprophytic fungi from dairy manure soil. *Annals of Biological Research* 3:1145-1152.

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## **Biography**

Tarvi is presently working as Senior Research Fellow, ICAR-Central Institute of Research on Buffaloes, Hisar, Haryana, India. She has good experience in the field of Soil and Fermentation Microbiology. Besides this, she also has experience in the techniques of molecular biology and biochemistry. Her carrier objective is to work proficiently and intellectually in the direction of farmer's welfare. Her publications include 13 research articles in referred national and international journals along with 16 research abstracts in national and international conference proceedings. She has attended and presented papers in more than 10 national and international conferences and has also received Best Thesis Award by Astha Foundation, Meerut, India.

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