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Functional Metagenomic Diversity of Rumen Microbiome for CAZymes and its Relation to Feed Type and Host

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This study aims to explore the microbial diversity of ruminant organisms *Bostaurus* (cow) and *Bubalus bubalis* (buffalo) under different feeding scenario and screen well-adapted rumen microbiome to select and characterize potentially enhanced lignocellulolytic enzyme-producing microbes. The microbiota of green roughage fed cow (NDC_GR), buffalo (NDB_GR) and dry roughage fed cow (NDC_DR), buffalo (NDB_DR) were explored using high-throughput sequencing. Analysis revealed the presence of highly complex bacterial community, with the maximal depiction by the phyla Bacteroidetes, Firmicutes, Actinobacteria and Proteobacteria. Moreover, bacteria were isolated and screened for exo-1, 4-β-glucanase, β-glucosidase, α-glucuronidase, endo-1, 4-β-xylanases, arabinosidase and α-galactosidase activities using differential chromogenic substrates. Forty- five isolates that showed multienzymatic activities were identified using 16S rDNA sequencing. Genome annotation of *P. polymyxa* ND24, capable of hydrolyzing various plant biomasses further revealed efficient lignocellulolytic machinery comprising ten cellulases and twenty-one hemicellulases, implicated for sustainable biomass hydrolysis. Present approach establishes the rumen microbiome as a substantial reservoir of industrially important bacterial strains for upgrading the possibility of lignocellulose utilization for the 'environmental friendly' approach of second-generation biofuels.

Biography:

Varsha Bohra is a Ph.D. scholar at CSIR–National Environmental Engineering Research Institute, Nagpur, India. She received her master's degree in Microbiology from Pt. Ravisankar Shukla University, Raipur. She has been awarded INSPIRE fellowship from department of science and technology, India. Her current research focuses on "the metagenomic study of rumen microbiome for exploring lignocellulolytic enzymes". She has authored 2 papers in peer-reviewed scientific journals (Applied Biochemistry and biotechnology, 3 Biotech) and attended three international conferences (BRSI, India; AMI, India).