OMICS Group Conferences
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2nd International Conference and Exhibition on
Food Technology, Bioprocess & Cell Culture
October 28-30, 2013 Kansas City Marriott Country Club Plaza, USA

Isolation and characterization of cellulase and protease producing microorganism from termite gut

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This work was designed to isolate and characterize cellulase and protease producing microorganisms from the gut of termite (termite biotechnology). Bacteria, such as *Salmonella spp., Streptococcus spp., Staphylococcus spp.* as well as *Bacillus subtilis*, and fungi, such as *Aspergillus niger* and *Aspergillus flavus* were isolated from the termites gut. Considering the biomass growth response and enzyme yield by the microorganisms, *Bacillus subtilis* and *Aspergillus niger* showed preferred characteristics, using skim milk agar and carboxyl methyl cellulose (CMC) respectively. Both enzymes were characterized for optimum pH and temperature. However, *Bacillus subtilis* exhibited higher cellulase and protease enzyme activities then compared to *Aspergillus niger*. Cellulase and protease enzyme activities were bserved in *Bacillus subtilis* after 24 and 18 hours of incubation with enzyme activity of 5.89×10^{-5} µg/ml/min and 3.25×10^{-2} µg/ml, at temperature 80°C and 60°C as well as pH 5 and 7 respectively. Whereas, Aspergillus niger showed cellulase and protease activity after 5 days of incubation period with activity of 6.82×10^{-5} µg/ml/min and 3.20×10^{-2} µg/ml, at 50°C and pH 4 and 7 respectively. Therefore, *Baccilus subtilis* and *Aspergillus niger* isolated from termite gut could be a good source of these thermostable enzymes, and termite is another promising biotechnological tool.

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