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 served in Bacillus subtilis after 24 and 18 hours of incubation with enzyme activity of $5.89 \times 10^{-5}$ µg/ml/min and $3.25 \times 10^{-2}$ 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 $6.82 \times 10^{-5}$ µg/ml/min and $3.20 \times 10^{-2}$ µg/ml, at 50°C and pH 4 and 7 respectively. Therefore, Bacillus 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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