Isolation and Identification of Thermophilic Compost Bacteria and Screening of Their Cellulolytic Activity

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Thermophilic bacteria are able to work at high temperatures that enable faster and more efficient reactions such as biomass conversion into glucose. The objective of this study is to isolate thermophilic bacteria from compost and to determine their cellulolytic activity. Soil compost were taken for culturing. A single strain of thermophilic bacteria was isolated from the culture and was screened for cellulolytic activity by culturing it on cellulose-Congo red agar media and by computing for the hydrolyzing capacity (HC). Visible clearing zones signifying positive cellulose hydrolysis were observed and used to evaluate the HC. HC was calculated to be ranging from 2.8 to 4.3. The bacterial isolate was identified up to genus level as a Bacillus sp. through a microscopic analysis performed by an expert from a national science institution. The isolated Bacillus sp.was grown in enzyme production media for crude cellulase extract preparation. Crude cellulase extract was subjected to carboxymethylcellulase activity assay. Results revealed that the cellulase showed little activity relative to glucose (standard) with the largest exhibited activity at 0.0065 µmol of glucose liberated by 1 mL of crude cellulose every minute. The study demonstrated that certain thermophilic compost bacteria are able to hydrolyze cellulose, and have potential for being developed for larger-scale use in converting biomass into fermentable sugars for bioethanol production.