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Isolation of Cellulase Producing Bacteria: Future Perspective for Bio-Ethanol Production

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Abstract

Currently, more than 95% of the ethanol is produced from simple biomasses such as mono-saccharides, disaccharides and starch. Thus, the cost of ethanol as an energy source is relatively high compared to fossil fuels, thus the world concerns is more on eco-friendly, cost effective ethanol production using microbes. The steps of bio-ethanol production mainly include the convert cellulosic biomass into fermentable sugar called 'Hydrolysis or Saccharification' and convert sugar into ethanol called 'Ethanol Fermentation'. Thus, present study was carried out to isolate cellulase producing bacteria from different environmental samples such as Cow dung, Compost soil and Termite gut content. All the samples were ten-fold diluted and pour plate and streak plate (with Carboxy methyl cellulose medium) method were employed in order to isolate bacteria strains. Based on different morphological features, (colony margin type, elevation, colony form, color). 15, 25, and 08 bacterial strains were isolated from cow dung, soil and termite gut content respectively. The cellulase activity of each bacterial strain was screened and assessed by the average diameter (AD) of hallow zones of Carboxy methyl cellulose media plates with the presence of gram's iodine. Six bacterial strains named CD14 (from cow dung), S6 (from compost soil) and T1, T2, T4, and T5 (from termite gut content) were selected for further experiments based on their cellulase producing efficiency. All four bacterial strains from termite gut were showed higher efficiencies (AD>19.33±0.057 mm) and out of them, strain T2 was the most efficient bacteria strain which showed an average diameter of 33.67±0.057 mm, on Carboxy methyl cellulose media plate.

Keywords: Cellulase producing bacteria, Bioethanol, Cellulose methyl cellulose