

## Isolation and Characterization of an Ethanol Resistant Bacterium from Sap of *Saccharum officinarum* for Efficient Fermentation

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**Abstract :** Bio fuel is one of the emerging industries around the world due to arise of crisis in petroleum fuel. Fermentation is a cost effective and eco-friendly process in production of bio-fuel. So inventions in microbes, substrates, technologies in fermentation cause new modifications in fermentation. One major problem in microbial ethanol fermentation is the low resistance of conventional microorganisms to the high ethanol concentrations, which ultimately lead to decrease in the efficiency of the process. In the present investigation, an ethanol resistant bacterium was isolated from sap of *Saccharum officinarum* (sugar cane). The optimal cultural conditions such as pH, temperature, incubation period, and microbiological characteristics, morphological characteristics, biochemical characteristics, ethanol tolerance, sugar tolerance, growth curve assay were investigated. Isolated microorganism was tolerated to 18% (V/V) of ethanol concentration in the medium and 40% (V/V) glucose concentration in the medium. Biochemical characteristics have revealed as Gram negative, non-motile, negative for Indole test, Methyl Red test, Voges-Proskauer's test, Citrate Utilization test, and Urease test. Positive results for Oxidase test was shown by isolated bacterium. Sucrose, Glucose, Fructose, Maltose, Dextrose, Arabinose, Raffinose, Lactose, and Sachcharose can be utilized by this particular bacterium. It is a significant feature in effective fermentation. The fermentation process was carried out in glucose medium under optimum conditions; pH 4, temperature 30°C, and incubated for 72 hours. Maximum ethanol production was recorded as 12.0±0.6% (V/V). Methanol was not detected in the final product of the fermentation process. This bacterium is especially useful in bio-fuel production due to high ethanol tolerance of this microorganism; it can be used to enhance the fermentation process over conventional microorganisms. Investigations are currently conducted on establishing the identity of the bacterium

**Keywords :** bacterium, bio-fuel, ethanol tolerance, fermentation

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