

## Characterization of an Isopropanol-Butanol Clostridium

**Authors :** Chen Zhang, Fengxue Xin, Jianzhong He

**Abstract :** A unique Clostridium beijerinckii species strain BGS1 was obtained from grass land samples, which is capable of producing 8.43g/L butanol and 3.21 isopropanol from 60g/L glucose while generating 4.68g/L volatile fatty acids (VFAs) from 30g/L xylan. The concentration of isopropanol produced by culture BGS1 is ~15% higher than previously reported wild-type Clostridium beijerinckii under similar conditions. Compared to traditional Acetone-Butanol-Ethanol (ABE) fermentation species, culture BGS1 only generates negligible amount of ethanol and acetone, but produces butanol and isopropanol as biosolvent end-products which are pure alcohols and more economical than ABE. More importantly, culture BGS1 can consume acetone to produce isopropanol, e.g., 1.84g/L isopropanol from 0.81g/L acetone in 60g/L glucose medium containing 6.15g/L acetone. The analysis of BGS1 draft genome annotated by RAST server demonstrates that no ethanol production is caused by the lack of pyruvate decarboxylase gene - related to ethanol production. In addition, an alcohol dehydrogenase (adhe gene) was found in BGS1 which could be a potential gene responsible for isopropanol-generation. This is the first report on Isopropanol-Butanol (IB) fermentation by wild-type Clostridium strain and its application for isopropanol and butanol production.

**Keywords :** acetone conversion, butanol, clostridium, isopropanol

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