

Cassava as a cheap source of carbon for rhizobial inoculant production using an amylase-producing fungus and a glycerol-producing yeast

Panlada Tittabutr, Waraporn Payakapong, Neung Teaumroong and Nantakorn Boonkerd*

School of Biotechnology, Institute of Agricultural Technology, Suranaree University of Technology, Nakhon Ratchasima 30000, Thailand

*Author for correspondence: Tel.: +66-44-224751, Fax: +66-44-224750, E-mail: nantakon@ccs.sut.ac.th

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Summary

The aim of this research was to develop methods to use low-cost carbon compounds for rhizobial inoculant production. Five raw starch materials; steamed cassava, sticky rice, fresh corn, dry corn and sorghum were tested for sugar production by an amylase-producing fungus. Steamed cassava produced the highest amount of reducing sugar after fermentation. *Bradyrhizobium japonicum* USDA110, *Azorhizobium caulinodans* IRBG23, *Rhizobium phaseoli* TAL1383, *Sinorhizobium fredii* HH103, and *Mesorhizobium ciceri* USDA2429 were tested on minimal medium supplemented with reducing sugar obtained from cassava fermentation. All strains, except *B. japonicum* USDA110, could grow in medium containing cassava sugar derived from 100 g steamed cassava per litre, and the growth rates for these strains were similar to those in medium containing 0.5% (w/v) mannitol. The sugar derived from steamed cassava was further used for production of glycerol using yeast. After 1 day of yeast fermentation, the culture containing glycerol and heat-killed yeast cells, was used to formulate media for culturing bradyrhizobia. A formulation medium, FM4, with a glycerol concentration of 0.6 g/l and yeast cells ($OD_{600} = 0.1$) supported growth of *B. japonicum* USDA110 up to 3.61×10^9 c.f.u./ml in 7 days. These results demonstrate that steamed cassava could be used to provide cheap and effective carbon sources for rhizobial inoculant production.