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メタデータ	言語: English 出版者: 公開日: 2019-12-20 キーワード (Ja): キーワード (En): 作成者: SAITHONG, Pramuan メールアドレス: 所属:
URL	https://doi.org/10.24514/00002864

Improvement of Yeast Strains Suitable for Bioethanol Production

Acetate tolerant yeast to prevention bacterial contamination during ethanol production process from molasses

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ABSTRACT

Bioethanol is one of the most important renewable energy. Bacterial contaminations are a major cause to reduced ethanol yield and inhibit yeast growth. Antibiotics are currently used to prevent contamination in the bioethanol production process. However, antibiotics remaining in the waste may create a direct impact on food, animals and human health. It is particularly important to prevent bacterial contaminants during bioethanol production process without using antibiotics.

My research project is "Acetate tolerant yeast to prevention bacterial contamination during ethanol production process from molasses". To design a bioethanol production process under acetate-containing conditions, acetate tolerant yeast is needed. To screen acetate tolerant strain, nearly 1,700 yeast strains from microbiological bank of National Food Research Institute (NFRI) were obtained. NFRI 3807 was showed high ethanol production ability in molasses medium containing acetate up to 1.0% (v/v) was taxonomically identified as *Schizosaccharomyces pombe*. The growth and ethanol production of NFRI 3807 were compared with *Saccharomyces cerevisiae* NBRC 0224. In acetate-free medium, the ethanol yields of both strains were nearly equal. However, in the molasses medium containing 1% acetate, only NFRI 3807 rapidly grew and produced ethanol. Co-cultivation of NFRI 3807 or NBRC 0224 with model bacterial contaminants in molasses containing 0.7% acetate medium was carried out. These results showed only NFRI 3807 could grow and ethanol production yield which is almost the same with the ethanol concentration in acetate free molasses medium. The ethanol yield of NBRC 0224 was not detected during co-cultivation. The results indicated that NFRI 3807 was more suitable to use for ethanol production under acetate-containing addition.