

論文内容要旨

Isolation and characterization of thermophile lactic acid bacteria from Thailand tropical fruits

(タイ産トロピカルフルーツを分離源とした
好熱性乳酸菌の探索分離及びその特徴)

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Some strains of lactic acid bacteria (LAB) produce exo-polysaccharide (EPS). As beneficial functions of the EPS, immunomodulation, anti-ulcer, and anti-virus activities have been reported. The aim of the present study is to isolate and characterize the thermophile LAB strains from Thailand fruits.

In this study, 316 LAB strains from 37 kinds of tropical fruits were isolated. In these LAB, 28 strains grew vigorously even at 45°C. Interestingly, two LAB strains, which were designated LY45 and PY45, produced EPS. The former and later strains were identified as *Pediococcus pentosaceus* and *Lactobacillus amylovorus*, respectively. The optimal temperature for the growth was examined by varying the culture temperature from 30°C to 50°C. The carbon source suitable for the EPS production by each strain was also determined by adding one of several sugars into a semi-defined medium (SDM) supplemented without yeast nitrogen base, but with 0.2% (v/v) vitamin solution and 0.1% (v/v) trace element solution.

The present study showed that the LY45 and PY45 strains can grow even at 50°C. With regard to the growth of the both strains at low temperature, the former strain can grow at 18°C, but not 10°C. On the other hand, the later strain can not grow even 18°C.

When 2% (w/v) maltose was added to the culture medium of the LY45 strain, the yield of EPS purified from the 48 h-culture was 23 mg/L. On the other hand, 1% (w/v) fructose was suitable for the EPS production by the PY45 strain. The yield of EPS purified from the 72 h-culture was only 6.8 mg/L. The cell viability of the LY45 and PY45 strains in each the culture both was 1.8×10^8 and 0.85×10^8 CFU/mL, respectively.

The profile of column chromatography using an anion-exchange resin indicates that the both strains produce acidic EPSs together with neutral one. Although the LY45 strain produces mainly neutral EPS, the PY45 strain produces acidic and neutral EPSs approximately equally.

The GC-MS profile of the LP45-derived EPS indicates that the neutral EPS is mainly composed of glucose and mannose as monosaccharide, whereas the acidic EPS consisting of mannose, glucose, and galactose. On the other hand, the monosaccharide contained in both of neutral and acidic EPSs produced by the PY45 strain is mainly mannose, with a trace of glucose.

The present study also shows that the PY45 strain utilizes starch as a carbon source. Therefore, *Lactobacillus amylovorus* PY45, which may generate EPS from a biomass starch,

will be useful as a meaningful bacteria in a health science industry.