ONLINE ISSN : 1880-7291
PRINT ISSN : 1344-7882

Journal of Applied Glycoscience
Vol. 54 (2007) , No. 2 pp.103-107

[PDF (451K)] [References]

Finding of Cyclodextrans and Attempts of their Industrialization for Cariostatic Oligosaccharides

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(Received December 5, 2006)
(Accepted January 9, 2007)

Cyclic isomaltooligosaccharides or cyclodextrans (CIs) are cyclic oligosaccharides of α-1,6 linked glucose residues. CIs are highly water-soluble and were found to strongly inhibit glucansucrase activity of mutans streptococci, so, CIs are expected to be utilized as cariostatic compounds. They are produced from dextran catalyzed by cyclic isomaltooligosaccharide glucanotransferase (CITase) and substrate dextran is produced from sucrose catalyzed by dextransucrase. CIs were found and isolated from the culture supernatant of *Bacillus circulans* T-3040 strain when it was cultured with dextran. The structure of CIs were determined by enzyme digestion test, ^{13}C-NMR analysis, and mass spectrum analysis. In order to produce CIs for commercial scale, the high dextran producing strain *Leuconostoc* sp. S-51 was isolated and the *B. circulans* T-3040 strain was mutated to produce about 110 times as much CITase as that of wild type strain. We also successfully detected CIs in brown sugar, which suggests CIs exist in nature.

Key words: cyclodextran, cyclodextran glucanotransferase, dental caries, inhibitor

[PDF (451K)] [References]

To cite this article:

Kazumi Funane, Tadaaki Tokashiki, Shigehachi Gibu, Yasuyuki Kawabata, Tetsuya Oguma, Hiroshi Ito, Masami Nakachi, Sadao Miyagi and Mikihiko Kobayashi: Finding of Cyclodextrans and Attempts of their Industrialization for Cariostatic Oligosaccharides . *J. Appl. Glycosci.*, **54**, 103-107 (2007) .

JOI JST.JSTAGE/jag/54.103