

Accepted Manuscript

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PII: S0717-3458(16)30133-6
DOI: doi:[10.1016/j.ejbt.2016.12.002](https://doi.org/10.1016/j.ejbt.2016.12.002)
Reference: EJBT 214

To appear in: *Electronic Journal of Biotechnology*

Received date: 28 August 2016
Accepted date: 7 December 2016

Please cite this article as: Niu Dandan, Qiao Jian, Li Pujun, Tian Kangming, Liu Xiaoguang, Singh Suren, Lu Fuping, Highly efficient enzymatic preparation of isomalto-oligosaccharides from starch with enzyme cocktail, *Electronic Journal of Biotechnology* (2016), doi:[10.1016/j.ejbt.2016.12.002](https://doi.org/10.1016/j.ejbt.2016.12.002)

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Electronic Journal of Biotechnology

EJBT-D-16-00137 R1

Original Research Article

Received: August 28, 2016

Accepted:

Areas: Food Biotechnology; Process Biotechnology

Highly efficient enzymatic preparation of isomalto-oligosaccharides from starch with enzyme cocktail

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Abstract

Background: Current commercial production of isomalto-oligosaccharides (IMOs) commonly involves a lengthy multi-stage process with low yields.

Results: To improve the process efficiency for production of IMOs, we developed a simple and efficient method for production of IMOs by using enzyme cocktails composed of the recombinant *Bacillus naganoensis* pullulanase produced by *Bacillus licheniformis*, α -amylase from *Bacillus amyloliquefaciens*, barley bran β -amylase and α -transglucosidase from *Aspergillus niger* to perform simultaneous saccharification and transglycosylation to process the liquefied starch. After a reaction of 13 h, 49.09% of IMOs (calculated based on the total amount of isomaltose, isomaltotriose and panose) was produced.

Conclusions: Our proposed method using an enzyme cocktail for efficient production of IMOs offers an attractive alternative to the current process for production of IMOs.

Keywords: *Aspergillus niger*; *Bacillus amyloliquefaciens*; *Bacillus licheniformis*; *Bacillus naganoensis* pullulanase; barley bran β -amylase; Isomalto-oligosaccharides production; Saccharification; Transglycosylation; α -amylase; α -transglucosidase.

1. Introduction

Isomalto-oligosaccharides (IMOs) are glucose oligomers of α -D-(1,6)-linkages with or without α -(1 \rightarrow 4) linkages [1], including among others isomaltose, panose,

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