Title: The effect of microwave irradiation on transglycosylation pathway of stevioside with starches or cyclodextrins catalyzed by a cyclodextrin glucanotransferase

Author: Yan-dong Zhang Wei Li Tong Lu Yong-mei Xia

PII: S1381-1177(15)30034-5
DOI: http://dx.doi.org/doi:10.1016/j.molcatb.2015.07.012
Reference: MOLCAB 3205

To appear in: *Journal of Molecular Catalysis B: Enzymatic*

Received date: 12-4-2015
Revised date: 17-7-2015
Accepted date: 18-7-2015

Please cite this article as: Yan-dong Zhang, Wei Li, Tong Lu, Yong-mei Xia, The effect of microwave irradiation on transglycosylation pathway of stevioside with starches or cyclodextrins catalyzed by a cyclodextrin glucanotransferase, Journal of Molecular Catalysis B: Enzymatic http://dx.doi.org/10.1016/j.molcatb.2015.07.012

The effect of microwave irradiation on transglycosylation pathway of stevioside with starches or cyclodextrins catalyzed by a cyclodextrin glucanotransferase

Yan-dong Zhang, Wei Li , Tong Lu, Yong-mei Xia*

State Key Laboratory of Food Science and Technology, School of Chemical and Materials Engineering, Jiangnan University, Wuxi, Jiangsu 214122, China

Highlights ▸

Highlights ► Microwave irradiation speeded transglycosylation of stevioside up to 20-folds. ► Microwave affects the transglycosylation pathway of *α/β*- cyclodextrin remarkably. ► Microwave does not affect the transglycosylation pathway of starches dramatically. ► Hydrolysis instead of enzyme deactivation caused the quick reaction equilibrium.

Graphical abstract

ABSTRACT

Microwave irradiation may alternate reaction specifity in multipath reactions. In this experiment, transglycosylation of stevioside with starches or *α/β*-cyclodextrin (CD) reached reaction equilibrium only in 3 min under low power microwave irradiation, when 10 U/g stevioside of a CGTase was applied. Microwave irradiation does not dramatically affect the transglycosylation pathway of the starches with stevioside, but it remarkably affects the transglycosylation pathway of *α/β*-CD onto stevioside. Unlike the case under conventional heating, the transformation between *α*-CD and *β*-CD was dramatically declined by microwave. With *α/β*-cyclodextrins as glycosyl donor, highly grafted products were diminished under microwave irradiation. Gelatinized starch produced much more cyclodextrins than hydrolyzed starch did, which made higher stevioside conversion with gelatinized starch.

Keywords: Stevioside; microwave; transglycosylation; cyclodextrin glucanotransferase; starch;