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

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Highlights ►

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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 The reaction was accelerated 20 times by microwave irradiation compared to that in the conventional heating procedure.

ABSTRACT

Microwave irradiation may alternate reaction specificity 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;

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