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Unusual transglucosylation reaction on a soybean isoflavone by amylosucrase from two different bacterial sources

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Amylosucrase (ASase, EC 2.4.1.4) belongs to glycoside hydrolase family 13 (GH13) and has uncommon three enzymatic activities of hydrolysis, polymerization and isomerization. ASase acts on substrates containing α-glucoside linkages and has a catalytic mechanism named α-retaining double displacement forming glycosyl-enzyme intermediate. In this study, two kinds of recombinant ASases from *Neisseria polysaccharea* (NPAS) and *Deinococcus geothermalis* (DGAS) were used for transglucosylation on daidzin. Daidzin is known as a major isoflavone and found in Kudzu and soybean. Transglucosylation of daidzin is expected to improve water-soluble, stability of chemical structure and taste. Two similar enzymes (NPAS and DGAS) showed quite different reaction products with same substrates. While the main transglycosylation products of NPAS reaction were daidzein-7-O-β-diglucoside and daidzein-7-O-β-triglucoside, those obtained by DGAS were daidzein-7-O-β-diglucoside and daidzin isomer. These results indicated that two enzymes may have different structural spaces inside the catalytic sites, which lead to the uncommon transglycosylation reactions.

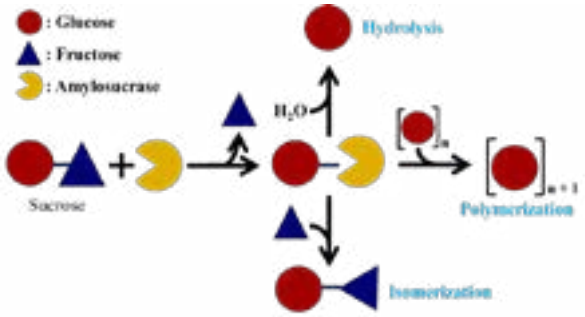

Figure 1. Action modes of ASase in hydrolysis, polymerization and isomerization of sucrose with water or acceptor molecule

Biography

Eun-Ryoung Kim graduated from Chung Buk National University and now has been in the Master's course in Food Microbiology and Biotechnology at Kyung Hee University.

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