

Characterization of Fatty Acid Glucose Esters as Os9BGlu31 Transglucosidase Substrates in Rice

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Abstract : Os9BGlu31 is a rice transglucosidase that transfers glucosyl moieties to various acceptors such as carboxylic acids and alcohols, including phenolic acids and flavonoids, in vitro. The role of Os9BGlu31 transglucosidase in rice plant metabolism has not been reported to date. Methanolic extracts of rice bran and flag leaves were found to contain substrates to which Os9BGlu31 could transfer glucose from 4-nitrophenyl β -D-glucopyranoside donor. The semi-purified substrate from rice bran was found to contain oleic acid and linoleic acid and the pure fatty acids were found to act as acceptor substrates for Os9BGlu31 transglucosidase to form 1-O-acyl glucose esters. Os9BGlu31 showed higher activity with oleic acid (18:1) and linoleic acid (18:2) than stearic acid (18:0), and had both higher k_{cat} and higher K_m for linoleic than oleic acid in the presence of 8 mM 4NPGlc donor. This transglucosidase reaction is reversible, Os9bglu31 knockout rice lines of flag leaves were found to have higher amounts of fatty acid glucose esters than wild type control lines, these data conclude that fatty acid glucose esters act as glucosyl donor substrates for Os9BGlu31 transglucosidase in rice.

Keywords : fatty acid, fatty acid glucose ester, transglucosidase, rice flag leaf, homologous knockout lines, tandem mass spectrometry

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