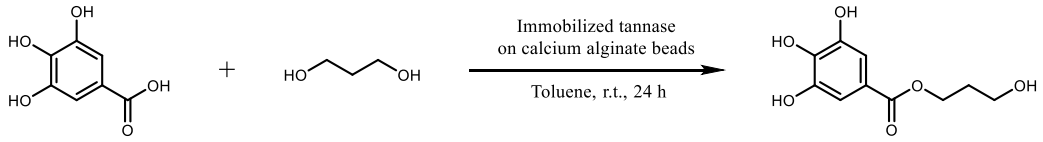
Tannase-Catalyzed Galloylation of Diols

([1]*College of Life, Environment, and Advanced Sciences, Osaka Prefecture University*, [2]*Graduate School of Science, Osaka Prefecture University*) ○Yuki Hatayama,[1] Naoki Kishi,[2] Hideo Kojima[2]

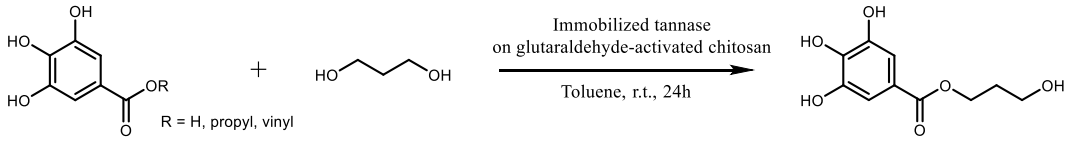
Keywords: Diols; Tannase; Galloylation

Tannase, which catalyzes the hydrolysis of the gallic acid esters like tannins to the corresponding alcohols and gallic acid,[1] has been utilized as an enzyme for food processing in the beverage industry.[2] However, practical enzymatic galloylation of alcohols using tannase is less focus in previous studies. We have investigated the enzymatic galloylation of diols in organic solvent using immobilized tannase. Gallic acid esters are useful as antioxidants. Now, we will report that galloylation of diols with galloyl donors in the presence of immobilized tannase proceeded to afford the corresponding gallic acid monoesters.

Thus, the reaction of 1,3-propanediol with gallic acid in the presence of tannase, which was immobilized on calcium alginate beads, in toluene for 24 h at room temperature gave the corresponding monoester in 7% yield (from its ^{1}H NMR spectrum).



With the use of tannase immobilized on glutaraldehyde-activated chitosan, the yield of monoester decreased to 2%. In the case of the reaction using propyl gallate instead of gallic acid, the monoester was obtained in 14% yield. Furthermore, with the use of vinyl gallate, the yield increased to 32%.



1) S. Dhiman, G. Mukherjee, A. K. Singh, *International Microbiol.* **2018**, 21, 175.

2) M. F. Ramadan In Enzymes IN Food Biotechnology: Production, Applications, and Future Prospects; K. Mohammed Ed., Elsevier: 2019; cp. 24, pp. 419-432.

© The Chemical Society of Japan