

## Galloylation of alcohols using immobilized *Aspergillus oryzae* tannase in organic media

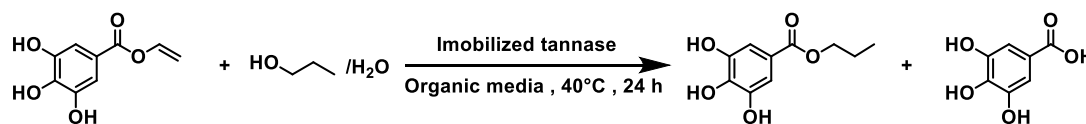
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Tannase, which catalyzes the hydrolysis of the gallic acid esters such as tannins to the corresponding alcohols and gallic acid,<sup>1</sup> has been utilized as an enzyme for food processing in the beverage industry.<sup>2</sup> However, the practical enzymatic galloylation of alcohols using tannase has received less attention in previous studies. Gallic acid esters are valuable as antioxidants. We have investigated the enzymatic preparation of gallic acid esters in organic solvents using immobilized tannase. In this report, we demonstrate that galloylation of alcohols with galloyl donors in the presence of immobilized *Aspergillus oryzae* tannase proceeds to afford the corresponding gallic acid esters. It is crucial to select organic media that can dissolve hydrophilic substrates without inactivating the enzyme. In this presentation, we will provide the details of the experiments.

For example, the reaction of 1-propanol with vinyl gallate in hexane/*tert*-butanol in the presence *Aspergillus oryzae* tannase immobilized on glutaraldehyde-activated chitin at 40°C for 24 h gave the corresponding gallic acid ester with the formation of gallic acid (Scheme 1). We found that the highest yield of propyl gallate was obtained with hexane/butanol (7:1) (Figure 1).



Scheme 1

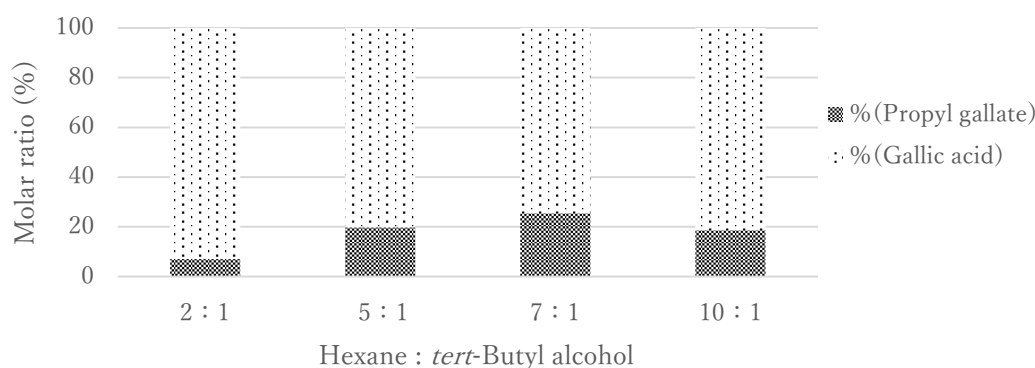


Figure 1

- 1) S. Dhiman, G. Mukherjee, A. K. Singh, *Int. Microbiol.*, **2018**, *21*, 175-195.
- 2) M. F. Ramadan, In *Enzymes in Food Biotechnology: Production, Applications, and Future Prospects*; K. Mohammed Ed., Elsevier: 2019; cp. 24, pp. 419-432.