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ABSTRACT BOOK

GLYCOSIDASE-CATALYZED SYNTHESIS OF GLYCOSYLATED NUTRACEUTICAL INGREDIENTS

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Hydroxyphenyl propenoic acids (hydroxycinnamic acids) and their alcohol derivatives are common components of the human diet which often occur in plants in the form of various glycosides. As the diets rich in polyphenols have repeatedly been related to low incidence of cardiovascular, neurodegenerative, and oncological diseases, various food supplements containing these compounds are becoming increasingly popular among the general population.

In quest of a biocatalytic route to structurally complex phenolic glycosides, we built a sustainable and convenient, one-pot two-enzyme method for the glucosylation of arylalkyl alcohols based on the synthetic exploitation of a fungal rutinosidase from *A. niger* and rhamnosidase from *A. terreus*. Both these enzymes were available to us as heterologous proteins produced by a recombinant strain of *P. pastoris.*

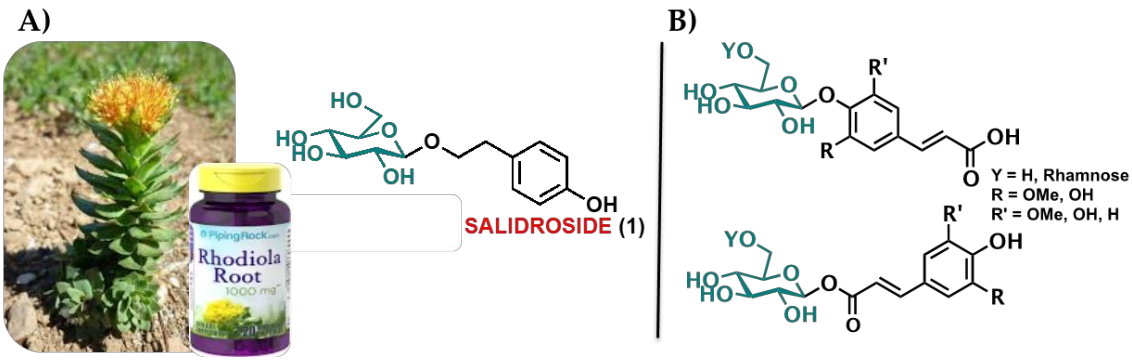

Figure 1. Examples of the synthetized glycosyl phenols.

As an example, the α-glucoside salidroside (**1**, **Figure 1A**), a compound endowed with various pharmacological effects and commercialized in *Rhodiola rosea* nutraceutical formulations, was obtained in high isolated yield and purity from tyrosol thanks to our one-pot enzymatic process. Furthermore, during the course of our investigation, we found that the rutinosidase from *A. niger* not only efficiently converted hydroxylated aromatic acids (*e.g. c*oumaric and ferulic acids) into the respective phenolic rutinosides, but surprisingly could also catalyze the formation of the respective glycosyl esters (**Figure 1B**).

Here the results of our systematic study about the glycosidase-based biocatalytic preparation of glycosylated nutraceutical ingredients, which lead us to the discovery of a unique enzymatic entry to naturally occurring glycosyl esters, are reported.

References

1. Bassanini, I. et al. *ChemSusChem* **2017**, *10*, 2040-2045;
2. Bassanini, I. et al. *Adv. Synth. Catal*. **2019**, *361*, DOI: 10.1002/adsc.201900259.