CATALYTICALLY ACTIVE PEPTIDES FOR CONJUGATE ADDITION REACTIONS

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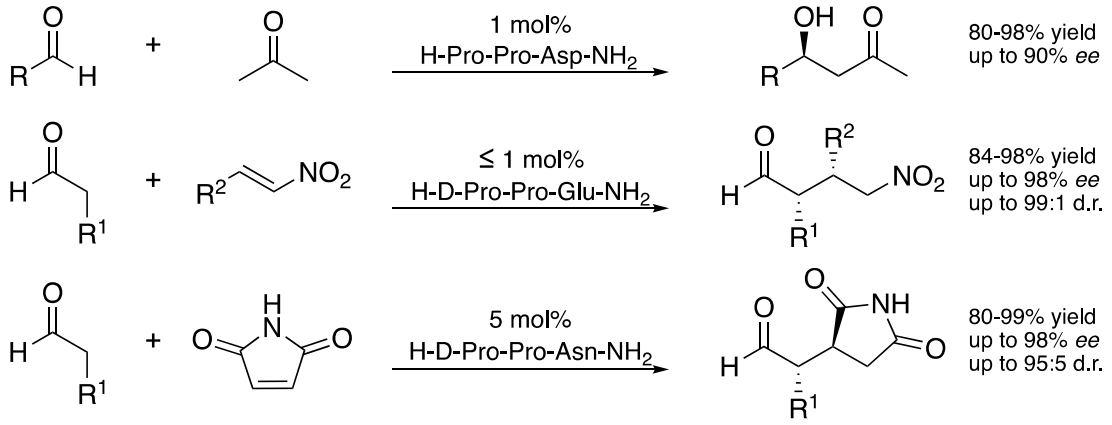
Peptides of the type H-Pro-Pro-Xaa (Xaa = any amino acid) are highly reactive and stereoselective catalysts for organocatalytic C–C bond formations, such as aldol reactions (H-Pro-Pro-Asp-NH_2) [1] as well as conjugate addition reactions of aldehydes to nitroolefins (H-D-Pro-Pro-Glu-NH_2) [2] and unprotected maleimide (H-D-Pro-Pro-Asn-NH_2), respectively [3]. The peptides are so reactive that catalyst loadings of less than 1 mol% suffice to obtain the products in high yields, enantio- and diastereoselectivities and the peptides can be immobilized and used in flow chemistry [4]. ESI-MS, *in situ* IR and NMR spectroscopic studies allowed for detailed insight into the mechanism [5].

Recently, our interests focused on the structural features of H-Pro-Pro-Xaa type peptides and in particular the *trans*/*cis* conformer ratio and hence its consequence for reactivity and stereoselectivity of the catalyst [6]. The poster will focus on the expansion of the scope of peptide catalyzed conjugate addition reactions to kinetic resolution and even more challenging substrates.



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[1] P. Krattiger, R. Kovasy, J. D. Revell, S. Ivan, H. Wennemers, *Org. Lett.* **2005**, 7, 6, 1101.

[2] a) M. Wiesner, M. Neuburger, H. Wennemers, *Chem. Eur. J.* **2009**, 15, 10103. b) J. Duschmalé, H. Wennemers, *Chem. Eur. J.* **2012**, *18*, 1111. c) R. Kastl, H. Wennemers, *Angew. Chem. Int. Ed.* **2013**, *52*, 7228.

[3] C. Grünenfelder, J. Kisunzu, H. Wennemers, *Angew. Chem. Int. Ed.* **2016**, 55, 8571.

[4] Y. Arakawa, H. Wennemers, *ChemSusChem* **2013**, *6*, 242.

[5] a) F. Bächle, J. Duschmalé, C. Ebner, A. Pfalz, H. Wennemers, *Angew. Chem. Int. Ed.* **2013**, 25, 4511. b) J. Duschmalé, J. Wiest, M. Wiesner, H. Wennemers, *Chem. Sci.* **2013**, 4, 1312. c) C. Rigling, J. K. Kisunzu, J. Duschmalé, D. Häussinger, M. Wiesner, M. O. Ebert, H. Wennemers, *J. Am. Chem. Soc.* **2018**, *140*, 10829.

[6] T. Schnitzer, H. Wennemers, *J. Am. Chem. Soc.* **2017**, 139, 15356.