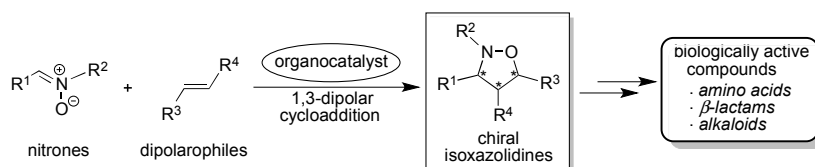


## Enantioselective 1,3-dipolar cycloadditions reaction of nitrones with $\alpha,\beta$ -unsaturated aldehydes promoted by a primary siloxy $\alpha$ -amino alcohol organocatalyst

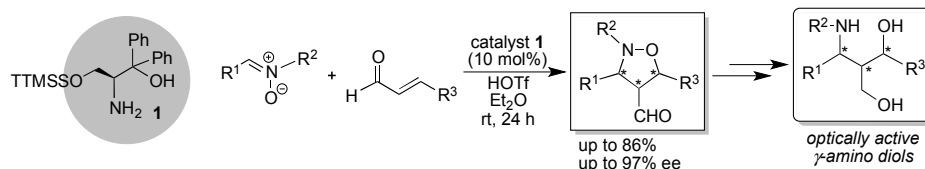
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Organocatalyzed asymmetric 1,3-dipolar (1,3-DP) cycloaddition of nitrones with dipolarophiles<sup>1</sup> is an efficient reaction for the construction of optically active isoxazolidines, and the obtained isoxazolidines are valuable optically active chiral building blocks for the synthesis of various biological compounds.



We found that simple primary TTMSS- $\alpha$ -amino alcohol organocatalyst **1**<sup>2</sup> showed superior catalytic activity in 1,3-DP cycloaddition of nitrones with  $\alpha,\beta$ -unsaturated aldehydes to provide high optically active isoxazolidines in good chemical yields (up to 86%) with excellent diastereoselectivities (up to *endo/exo* = 96/4) and enantioselectivities (up to 97% ee). Furthermore, the obtained optically active isoxazolidines were easily converted to  $\gamma$ -amino diols having three successive stereogenic centers. This work will be presented and discussed in detail.



1. Jen, W. S.; Wiener, J. J. M.; MacMillan, D. W. C. *J. Am. Chem. Soc.* **2000**, *122*, 9874.
2. (a) Kohari, Y.; Okuyama, Y.; Kwon, E.; Furuyama, T.; Kobayashi, N.; Otuki, T.; Kumagai, J.; Seki, C.; Uwai, K.; Dai, G.; Iwasa, T.; Nakano, H. *J. Org. Chem.* **2014**, *79*, 9500. (b) Suttibut, C.; Kohari, Y.; Igarashi, K.; Nakano, H.; Hiramata, M.; Seki, C.; Matsuyama, H.; Uwai, K.; Takano, N.; Okuyama, Y.; Osone, K.; Takeshita, M.; and Kwon, E. *Tetrahedron Lett.* **2011**, *52*, 4745.