Asymmetric Arylative Dearomatization of 2,3-Disubstituted Indoles

Significance: A chiral phosphoric acid catalyzed asymmetric arylative dearomatization of indoles is reported. The chiral phosphoric acid \((\text{R})\)-TRIP \(1\) promotes the cascade 1,4-addition–alcohol elimination of quinone imine ketals \(2\) and disubstituted indoles \(3\) to give arylation products \(4\). If the reaction is followed by the addition of a Hantzsch ester, a one-pot tandem arylative dearomatization–transfer hydrogenation can be promoted to give indolines \(5\) possessing two consecutive stereocenters in high yields and excellent enantioselectivities.

Comment: The authors propose that TRIP activates the indole nucleophile and the \(\alpha,\beta\)-unsaturated imine electrophile through dual hydrogen bonding, promoting the enantioselective 1,4-addition, which is followed by alcohol elimination. The transfer hydrogenation step occurs with excellent diastereoselectivity, controlled by the first stereocenter. However, the enhanced enantiomeric excess of products \(5\) compared to products \(4\) is due to a kinetic resolution effect facilitated by the catalyst.

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