

# Expanding of the scope of Castagnoli–Cushman reaction: Anhydrides of cyclic 1,2-dicarboxylic acids

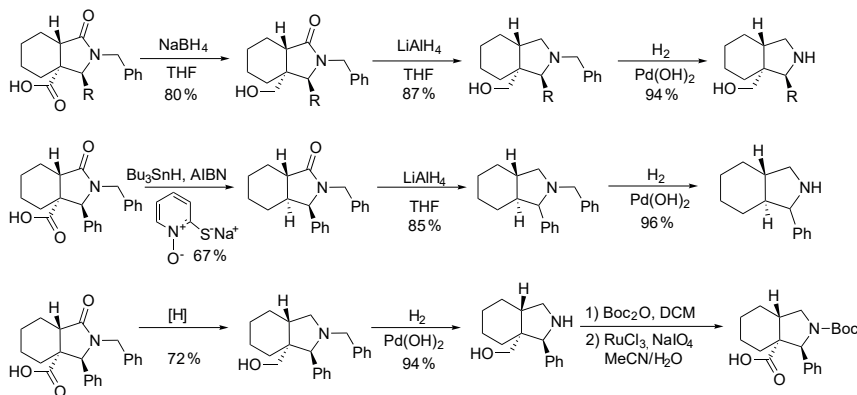
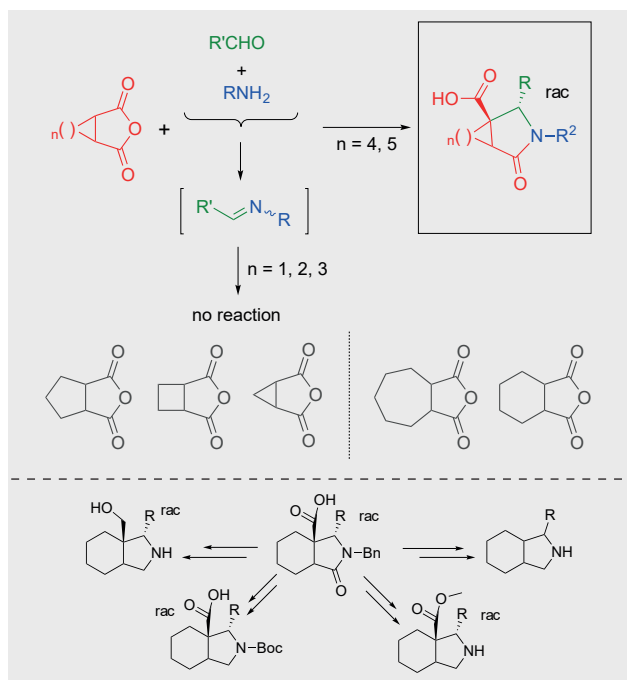
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## Introduction and Aim

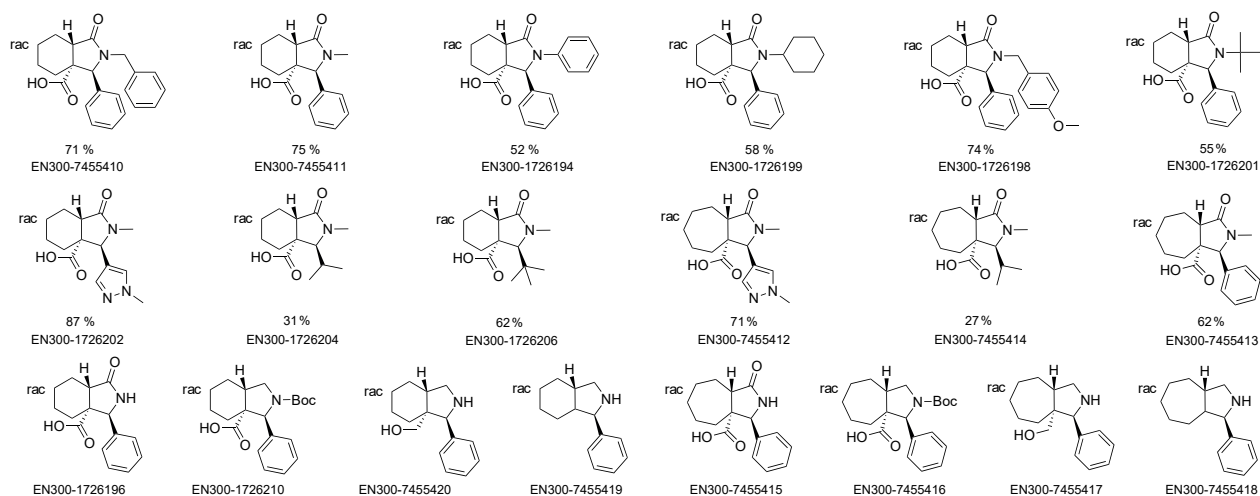
Thorough exploration of chemical space relevant for medicinal chemistry requires synthetic methods, which open access to potential lead compounds in an efficient manner. Multicomponent reactions are especially promising in this view since they provide sufficient diversity of the compound libraries with minimum synthetic efforts required. In particular, Castagnoli-Cushman reaction (CCR), i.e. condensation of imines with cyclic anhydrides, has been considered as an efficient tool for synthesis of pyrrolidones and piperidones, as well as their fused and heteroatom-substituted analogues.

In our ongoing research in discovering of the scope and limitation of this useful reaction the anhydrides of cyclic 1,2-dicarboxylic acids were utilized. We showed that the possibility of the reaction depends on the geometry of anhydrides and, therefore, on the size of the condensed ring. The reaction happens only for anhydrides, with such condensed ring's size, for which the trans-geometry of the final product is stable. So anhydrides with 6- and 7-membered condensed ring can be used in CCR, unfortunately 5-, 4- and 3-membered cannot. This results mismatch to all known mechanistic aspects proposed in the literature. So the additional investigations is needed for the determination of the mechanism. The products obtained open the way to new classes of bicyclic building blocks: amines, amino acids, amino alcohols and so on.

## Additional Functionalization



## Results



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