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Stereoselective Glycosylation and Functionalization of Unbiased Site of Sweet System via Dual-Catalytic Transition Metal Systems/Wittig Reaction

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Abstract : The field of glycoscience has burgeoned in the last several decades, leading to the identification of many glycosides which could serve critical roles in a wide range of biological processes. This has prompted a resurgence in synthetic interest, with a particular focus on new approaches to construct the selective glycosidic bond. Despite the numerous elegant strategies and methods developed for the formation of glycosidic bonds, stereoselective construction of glycosides remains challenging. Here, we have recently developed the novel Hexafluoroisopropanol (HFIP) catalyzed stereoselective glycosylation methods by using KDN imidate glycosyl donor and a variety of alcohols in excellent yield. This method is broadly applicable to a wide range of substrates and with excellent selectivity of glycoside. Also, herein we are reporting the functionalization of the unbiased side of newly formed glycosides by dual-catalytic transition metal systems (Ru- or Fe-). We are using the innovative Reverse & Catalyst strategy, i.e., a reversible activation reaction by one catalyst with a functionalization reaction by another catalyst, together with enabling functionalization of substrates at their inherently unreactive sites. As well, we are targeting the diSia derivative synthesis by Wittig reaction. This synthetic method is applicable in mild conditions, functional group tolerance of the dual-catalytic systems and also highlights the potential of the multicatalytic approach to address challenging transformations to avoid multistep procedures in carbohydrate synthesis.

Keywords : KDN, stereoselective glycosylation, dual-catalytic functionalization, Wittig reaction
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