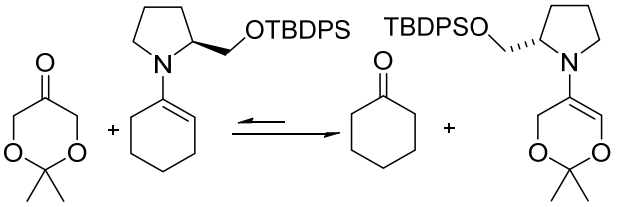
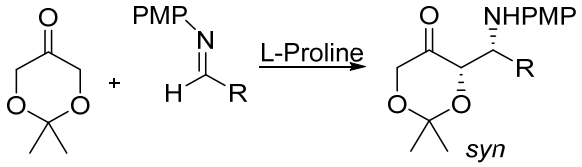
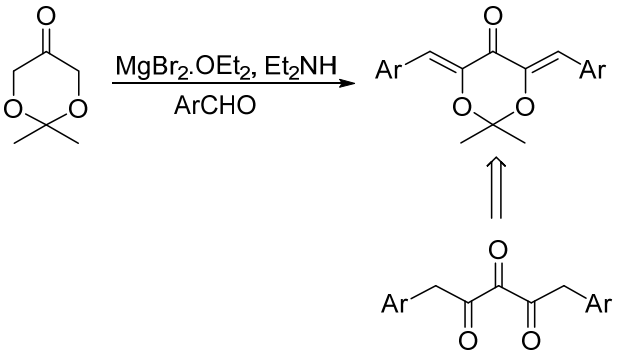
**(I)** NMR spectroscopy in DMSO-*d6* was used to study the equilibria between cyclic enamines with 2,2-dimethyl-1,3-dioxane-5-one. Comparison of the exchange results showed a preferable tendency of the carbonyl compounds to convert to the respective enamines. Results also showed that aldehydes are more prone than ketones to give enamines. However, there were some exceptions to this. For example, 1,3-dihydroxyacetone acetals or 3,5-dioxacyclohexanones (2-phenyl-1, 3-dioxan-5-one and 2,2-dimethyl-1,3-dioxan-5-one) had higher tendencies to give enamines than several aldehydes with α-substituents [17].



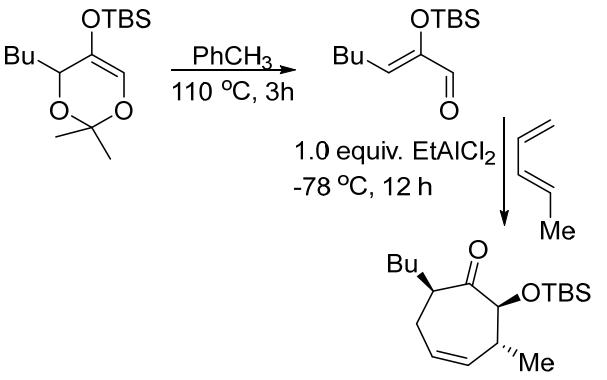

**(J)** An organocatalytic anti-Mannich reaction was developed for dihydroxyacetone and acyclic dihydroxyacetone derivatives which provided a facile route to amino sugars. The reaction was catalyzed with an amino acid and a variety of imines were used. The results complemented previously reported proline-based strategies to prepare amino sugars. In other words, this work presented the first direct catalytic asymmetric Mannich reactions to use unprotected dihydroxyacetone and acyclic protected dihydroxyacetones [18].



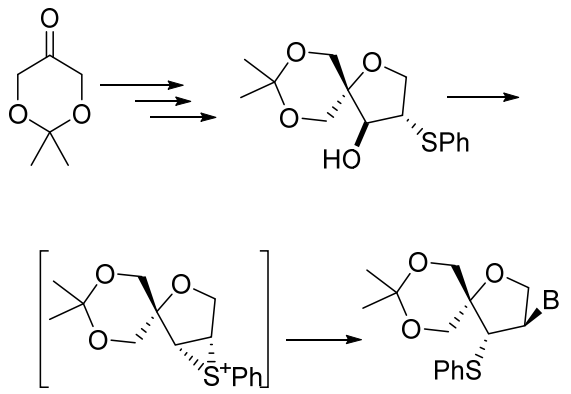

**(K)** A double crossed-aldol condensation process was reported for the reaction of 1,3-dioxan-5-one with a variety of aromatic aldehydes. The condensation took place in the presence of diethylamine and magnesium bromide diethyl etherate at room temperature. As a result, 4,6-bis(arylmethylidene)dioxan-5-ones were obtained in good yields via a one-pot process. Spectroscopic methods and X-ray crystallography showed that the products have *Z*,*Z*-configuration for the exocyclic double bonds [19].




**(L)** TBS-protected enol of 2,2-dimethyl-1,3-dioxane-5-one underwent a retro-cycloaddition reaction in refluxing toluene to form the respective TBS-protected enal intermediate. The process stereoselectively afforded *Z*-stereoisomer which then cycloadded to 1,3-pentadiene to provide the final trisubstituted chiral cycloheptene with 97:3 tendency for the formation of the exo product [20].



**(M)** A new group of anti-HIV nucleosides were synthesized via a novel synthetic method leading to isonucleosides. The process took place in six steps by converting 2,2-dimethyl-1,3-dioxan-5-one to a dioxabicyclohexane derivative. First the epoxide group was cleaved with thiophenol and the resulting intermediate was subjected to the Mitsunobu conditions. Use of a nucleobase caused the formation of the desired isonucleoside after the thiophenol group migrated in the course of the reaction. Then the thiophenyl group was removed under radical conditions. Finally, a deprotection step gave racemic mixture of the desired molecule [21].

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