

ABSTRAKT

Resently, we observed a growing interest in organic catalysts i.e. organocatalysts. Enantioselective organocatalysis is complementary to metal-catalysed transformations and has accelerated the development of new methods to make diverse chiral molecules. The synthesis simplicity, ready availability of catalysts and low toxicity associated with organocatalysis makes it an attractive method to synthesise complex structures.

In the past few years, the utilization of chiral (thio)ureas has emerged as a viable strategy in the design of efficient organocatalysts for asymmetric organic transformations. The (thio)urea catalysts are famous as molecules able to form a double hydrogen bonds with the substrates thereby activating or coordinating the substrates or even these both functions act in a synergistic manner.

Organocatalysts bearing hydrogen bonding activating group are the subjects of intensive research. The double hydrogen-bonding interaction of N-H of (thio)urea and reactant has been generally realized to have a specific role in the efficient catalysis and high enantiocontrol.

The aim of study was a synthesis a class of novel chiral urea and thiourea organocatalysts in combination from commercially available, inexpensive monosaccharides such as: glucose, galactose and disaccharides such as: lactose, cellobiose and mellibiose. Carbohydrates, which are inexpensive and readily available natural materials, have recently been employed as chiral backbones of organocatalysts. Saccharides are readily available in a variety of diastereomeric forms, chiral and conformationally rigid molecules providing a well defined three-dimensional spatial arrangement of substituents and various multi-configured hydroxyl groups for chemical modification.

The first step in this synthesis was the selective introduction of an azide group onto the saccharide. In the second step used of such derivative in the reaction Staundinger-aza-Wittig, also known as the „phosphine imide reaction”. The synthesis of (thio)urea organocatalysts was carried out in straightforward way by mixing carbohydrate azide and triphenylphosphine in toluene for 1 h at room temperature and then adding proper amines to the mixture, which

was stirred for 24 h under CO₂ bubbling conditions. The final products was obtained from 31% to 97% yields.

In order to study the catalitic activity of new organocatalysts in the asymeric Michael, Mority-Baylisa-Hillmana and aza-Henry reactions.