Abstract

Supramolecular chemistry is one of the fastest growing and most active field of chemistry which examines weak and reversible non- covalent interactions between host and guest molecules. The development of artificial receptors able to create complexes with particular guest has been important to the progress of supramolecular host- guest chemistry. Macrocycles are very useful in supramolecular chemistry because they form cavities that can entirely surround guest molecules and can be chemically modified to attune their properties.

The aim of my study was to obtain new derivatives of carbohydrates and azacrown ethers via the Staudinger-aza-Wittig reaction also known as the „phosphine imide reaction". It involves reaction nucleophilic phosphorus reagent such as triphenylphosphine with azide to generate iminophosphorane intermediate that react with carbon dioxide in the presence of nitrogen nucleophile. When the nucleophile is an amine (primary or secondary), the urea derivative is the product of this reaction.

I have obtained compounds that contain in their structures two units of saccharides and one molecule of azacrown ether. These type of compounds have been called pseudocryptands due to their complexing properties which are common for cryptands. On the other hands their structure haven't been typical for this type of connection. I have also received closed forms of macrocycles- so called cryptands- which consist of both two molecules of carbohydrates and two molecules of azacrowns. The binding studies allowed me to establish experimentally that the new hosts interact efficiently with neutral molecules (paracetamol, aspirin and *p*-toluenesulfonamide) to form supramolecular species. I have confirmed that the size of the ether cavity and solvent impact on the stability of the guest- host complexes and that the supramolecular complex is formed through noncovalent interactions.