Synthesis of the urea/thiourea sucrose derivatives and their application in asymmetric Michael reaction.

Asymmetric synthesis plays an important role in modern organic chemistry. Preparation of the optically pure products is particularly important, because the enantiomers of the same compound often have different biological activity. One of the main processes for creation of optically active material is undoubtedly the catalytic asymmetric reaction. The catalysts, use in this type reactions are usually complexes of the transition metals, which have, however, one main drawback; they are toxic and thus are hardly accepted by pharmaceutical industry. The alternative to this problem is the use of so-called organocatalysts, *i.e.* chiral optically pure compounds. Their big advantage is the low toxicity and cost, high availability, chemical stability in the atmosphere of oxygen and resistance to air and water. Therefore, we observe the continuous search for the new organocatalysts, able to induce the desired stereochemical course of the reactions. Literature review indicates that compounds containing the urea/thiourea moiety are particularly suitable for the organocatalyst role.

The main purpose of this project is to create a library of new sucrose derivatives containing the urea or thiourea moiety and test them in the asymmetric Michael reaction. The results obtained within this project can bring a new aspect in the development of modern methods of stereoselective preparation of organic compounds. The new sucrose-urea/thiourea derivatives can give additional species to the already wide range of standard organocatalyst.

The knowledge about the impact of the three dimensional structure of sucrose derivatives on the catalytic reactions, especially including the asymmetric induction is very limited. The major advantage of the proposed project is the opportunity to explain the role of this di-saccharide as a platform directing the stereochemical course of the reaction.