Flavonoids are compounds which belong to polyphenols commonly found in plants. Among this broad group of compounds are distinguished flavones, isoflavones, flavanones and isomers of the latter - chalcones. Due to the structure containing an α,β-unsaturated bond and a variety of substituents in the aromatic rings, chalcones have a wide spectrum of biological properties including antioxidant, anticancer, antibacterial, antifungal, anti-inflammatory or anti-malarial activity.

The aim of the project is to investigate the biological activity of nitrogen derivatives of *trans*-chalcone, which are not described in the literature. Current reports show, the compounds having an amino group display a high inhibitory activity with respect to myeloperoxidase (MPO) - an enzyme secreted by neutrophils. It plays an important role in many inflammatory and cardiovascular system diseases such as vasculitis, arteritis, or atherosclerosis. Furthermore, results of research carried out on the Caco-2 and HL-60 cell lines shows that nitrogen derivatives of flavonoids exhibit inhibitory effect on cells proliferation at micromolar concentration.

Microbiological transformations allow the use of microorganisms to receive compounds which chemical synthesis is sometimes difficult or associated with high costs. Moreover, the enzymatic system of microorganisms allows to obtain products showing often higher biological activity than substrates. Previous studies conducted in our team have shown that aerobic bacteria of the genus *Rhodococcus* and *Gordonia* are capable of microbial transformations of chalcones. Enzymatic system of these microorganisms allows the reduction of the double bond present in the carbon chain connected with aromatic rings. Products in the form of dihydrochalcone derivatives are the interesting group of compounds characterized with sweet taste. A well-known product of the reduction is hesperetin dihydrochalcone, which is 300 times sweeter than popular disaccharide, sucrose. Appropriate selection of biotransformation conditions lead to obtain a second product - alcohol - formed by reduction of the carbonyl group. As a result of microbiological transformation it is possible to obtain the hydroxylated derivatives of flavonoids with increased antioxidant potential.

Derivatives obtained in both ways - chemical and microbiological - will be the basis for biological studies. Antimicrobial activity will be determined as the inhibitory effect of nitrogen derivatives of chalcones on the growth of pathogens urinary system, skin diseases or inflammatory disorders caused by bacteria, fungi and yeasts. Furthermore, analysis of the relationship between structure and activity of the resulting derivatives will determine the effect of nitrogen substituents on the effectiveness of *trans*-chalcone analogues. Results of this study will allow to describe their possible application as antioxidants and inhibitors of proliferation of cancer cells.