

Beauvericins and enniatins belong to the wide group of non-ribosomal cyclic depsipeptides – toxins produced by a wide range of fungal species, mainly from the *Hypocreales* order. These fungi are frequent pathogens of crops, causing plant diseases and significant losses in agriculture. Therefore, they significantly affect crops' quality and, hence, human food and animal feed quality. Mycotoxins accumulated in plant tissues, even in relatively small amounts, exhibit cytotoxic action to human and animal cells. The aim of this project is to investigate the differences in biosynthesis and accumulation of toxins between different producers – pathogens of plants and insects: *Isaria fumosorosea*, *Fusarium proliferatum* and *Fusarium oxysporum*. Using a combination of classical mycological techniques and molecular biology techniques, it will be possible to describe the influence of environmental factors (presence of chitin or oxylipin in the habitat, which are important components of molecular communication mechanisms between fungi) on the biosynthesis of harmful metabolites. Description of occurring reactions will allow us to answer the question how the variation of inhabited ecological niches (parasitism on insects, plant pathogenicity, dead biomass degradation) reflects the ability of fungi to use available metabolic tools (toxins). In the future, understanding the mechanisms of biosynthesis of a wide range of mycotoxins can help us better and faster identify those toxins, which would be beneficial for human and animal health protection, and may even have an efficient use of produced metabolites as a basic source of new medical drug products.