

12th International Congress on**Microbial Interaction and Applications of Beneficial Microbes**

July 17-18, 2017 Munich, Germany

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Insect-derived beneficial microbes for industrial applications

Industrial (white) biotechnology focuses on the biotransformation of raw materials into useful industrial products, predominantly using microbes and/or enzymes. Insects, the most diverse group of organisms on the earth, owe part of their evolutionary success in extreme habitats to their own version of white biotechnology-symbiosis with microorganisms. The presentation highlights how the industrial biotechnology toolbox can be expanded by developing insect-associated microbes as biological resources for the production of enzymes and as tools in their own right, e.g. for the conversion of biomass. Focusing on selected examples such as the black soldier fly *Hermetia illucens*, the burying beetle *Nicrophorus vespilloides* or the clothes moth *Tineola bisselliella* it is demonstrated how advanced and complementary methods covering biochemistry (bioassays, proteomics), molecular biology (genomics, RNA-Seq and candidate gene-centered analysis of insect hosts and their microbiota) and cell biology (cell cultures, enzyme assays, biotechnology-based processing) are used to decipher the interactions between insect species occupying unique ecological niches and their microbiota, emphasizing the partitioning of adaptive processes between the host and symbionts to convert biomass more efficiently.

Biography

Andreas Vilcinskas is a Professor of Applied Entomology and Director of the Institute for Insect Biotechnology Justus Liebig University Giessen, Germany. His fields of research are insect biotechnology; development of innovative approaches for the control of pest and vector insects; insect immunity, ecology and evolution; invasion biology; and genome biology and epigenetics of insects.

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