The project concerns the search for new, naturally occurring yeasts that may be used in environmentally friendly biotechnology—particularly in the degradation of recalcitrant waste and the production of valuable compounds such as vitamins, bioplastics, or industrial enzymes. The aim of the project is to investigate whether insects feeding on decaying organic matter—so-called detritivorous insects—constitute a source of yet undescribed microorganisms with such properties.

The study will include three commonly occurring insect species: the silverfish (*Lepisma saccharinum*), the oriental cockroach (*Blatta orientalis*), and the yellow mealworm (*Tenebrio molitor*). These insects inhabit environments rich in difficult-to-degrade substances such as cellulose, keratin, or chitin, which suggests that their associated yeasts may exhibit unique capabilities for breaking down these compounds. The project plans to isolate, identify, and characterize these yeasts—both in terms of enzymatic activity and resistance to environmental stress factors (e.g. high temperature, salinity, low pH).

The project will employ both classical microbiological methods and modern techniques in molecular biology and bioinformatics. The isolated yeasts will be examined for their potential to produce compounds of industrial and environmental relevance, such as vitamin B2, lipids, or biodegradable polymers. In a later stage, the genetic material of the strains will be analyzed, and their metabolic pathways will be reconstructed.

The subject of the project was chosen in response to the growing need to develop more sustainable and environmentally friendly biological technologies. Microorganisms from natural, extreme environments—such as the gastrointestinal tract of detritivorous insects—may prove key to modern solutions in recycling, renewable material production, and waste reduction. The expected outcomes of the project include the identification of new yeast strains with industrial potential and a deeper understanding of the insect microbiome and its functional role.