

Entomoremediation in the utilization of troublesome organic wastes

Sewage sludge is a by-product of the industrial and municipal wastewater treatment process. They contain both biogenic elements and an organic substance, which indicates the possibility of their use in agriculture as a fertilizer or for the purposes of soil engineering and recultivation. However, this application is strongly limited, as sewage sludges may contain heavy metals, persistent organic pollutants of anthropogenic origin and pathogenic organisms (including microorganisms). Therefore, their use in practice requires application in accordance with legal standards, and their addition to the soil must be selected so that the permissible limits are not exceeded (eg. for the content of heavy metals).

Entomoremediation (Greek entomon - insect and Latin remedy - clean or restore) can be defined as the use of specialized insects together with associated microorganisms for the utilization, extraction, sequestration and detoxification of soil, sediments or biomass contaminants. Entomoremediation can be treated as a new sub-domain of bioremediation, which has only recently been demonstrated in practice. This was possible due to the use of saprophytic insect larvae, characterized by very high resistance to adverse environmental conditions. These larvae, in addition to reducing the amount of such nuisance waste products as sludge, accumulate also heavy metals in their bodies, which makes it possible to reduce the degree of contamination.

During studies, PhD student will focus on issues related to entomoremediation and utilization of various sources of sewage sludge and organic biomass with high content of heavy metals and will examine bioconcentration and fractionation of metals in various insect body parts.

Scientific supervisor: prof. dr hab. A. Bieganski, assistant supervisor: dr P. Bulak

Profile of the candidate:

- Master of Science degree on chemistry, biology, biotechnology, food science or similar,
- experience in working in a chemical laboratory
- experience in the preparation of organic substances or work with a gas chromatograph
- high motivation, good time and work management
- ability to work independent
- good communication skills
- good command of the English language