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### Proposed topic of a doctoral thesis 2021

Topic: Application of pectin-cellulose hydrogels as a new carrier of antagonistic microorganisms.

Doctoral thesis will be conducted in the frame of the project Opus No. 2020/37/B/NZ9/03159 “Cellulose-pectin hydrogels cross-linked with divalent metal ions for immobilization of antagonistic microorganisms”.

Principal Investigator of the project, Supervisor of PhD thesis– Justyna Cybulska

The amount planned for the scholarship in the project: 108 000 PLN

Delivery systems of beneficiary microorganisms to plants should provide high viability of microorganisms and their controlled release to soil. Carriers should be biodegradable and environmentally safe. The aim of doctoral thesis will be biosynthesis of pectin-cellulose hydrogels reinforced by divalent metal ions and their application for immobilization of antagonistic microorganisms. Methodology of immobilization will be developed including application of encapsulation and spray drying technique. In order to evaluate the effectiveness of the hydrogels to protection of microorganisms simulation of biodegradation will be conducted. Chemical composition, nanomechanical properties and supramolecular structure of new biomaterials will be determined. The result of doctoral thesis will be contribution in for development of bioproducts based on bacterial cellulose and pectins for agricultural applications and therefore an impact on bioeconomy and development of “green chemistry”.

Profile of the candidate:

- Master of Science degree in chemistry, biology, biotechnology, environmental protection, food technology or similar,
- good knowledge on chemistry, biochemistry, biotechnology,
- proven record of research activities (e.g. research internships, participation in scientific conferences),
- practical laboratory experience,
- high motivation to conduct scientific research,
- good communication skills including a very good command of the English language,
- ability to work independent.