

The Institute of Agrophysics, Polish Academy of Sciences, Department of Microstructure and Mechanics of Biomaterials is looking for **PhD student** in the Doctoral School of Interdisciplinary Doctoral School of Agricultural Sciences. PhD student will receive a scholarship (48 months) in the amount of PLN 5,000 / month (gross).

PhD thesis proposal:

Polysaccharides adsorption on microfibrillar cellulose as an *in vitro* studies of plant cell wall.

- The PhD project will take place for 48 months (from 01.10.2020) at the Department of Microstructure and Mechanics of Biomaterials, Institute of Agrophysics, Polish Academy of Sciences, Lublin, Poland under PhD supervision of dr hab. Monika Szymańska-Chargot (m.szymanska@ipan.lublin.pl, www).
- The PhD project is partially financed within the NCN project OPUS. Studentship is ensured during the PhD project.
- Language of PhD course and thesis: English or Polish.
- The PhD candidate should meet the minimum skill standard in chemistry, biochemistry or plant physiology. Master Degree completed before the contract starting date is required.
- For application details (documents, procedures, deadlines) please go to the website of the [Interdisciplinary Doctoral School of Agricultural Sciences](http://www.interdisciplinarydoctoralschool.pl).

Keywords: *cellulose, nanocellulose, plant cell wall, polysaccharides, FTIR spectroscopy, Raman spectroscopy, analytical chemistry.*



? INTERACTION ?

The aim of this research is to investigate the nature of interactions between microfibrillar cellulose (the most closely related for its natural state in the cell wall; isolated from fruit tissue) and other non-cellulosic polysaccharides – the main constituents of the cell wall. The *in vitro* studies using adsorption technique are conducted to help understanding the plant cell wall structure. This approach is relatively simple

but gives a lot of valuable information about the process kinetics and the nature of the interaction between adsorbent and adsorbate. Furthermore, such studies would allow to separate the effect of metabolic processes from the effect of different pectin and hemicellulose concentrations on cell wall structure as well as cellulose microfibrils structure and organization. This knowledge is indispensable if it comes to understanding the process of plant cell wall development, which in turn is important from biologist and biotechnologist point of view. In addition, the obtained research results will be able to be used in the future to design new materials with unique properties, as well as to improve existing ones. And finally, it is important for understanding the mechanical and the texture properties of plant materials such as fruits and vegetables from consumer point of view.

References

1. Szymańska-Chargot, M., Chylińska, M., Pieczywek, P.M., Zdunek, A. Tailored nanocellulose structure depending on the origin. Example of apple parenchyma and carrot root celluloses. *Carbohydrate Polymers* 210 (2019) 186-195
2. Myśliwiec, D., Chylińska, M., Szymańska-Chargot, M., Chibowski, S., Zdunek, A. Revision of adsorption models of xyloglucan on microcrystalline cellulose. *Cellulose*, 23 (5) (2016) 2819-2829.

Do not hesitate to contact with dr Monika Szymańska-Chargot (m.szymanska@ipan.lublin.pl) with any question related to the PhD project.