The investigation of polysaccharides adsorption on cellulose surface

The plant cell wall is an extremely complex system Structural features of plant cell wall polymers have been the subject of research and are now largely defined. Over the years, several models have been proposed to explain the organization of cell wall components. Their common assumption is that cellulose microfibrils are surrounded and bound by hemicelluloses. The formed cellulose/hemicellulose network is immersed in a spatial network containing highly hydrated pectins. However, recent critical evaluation suggests that, although correct in outline, those models are an oversimplification. In vivo studies of plant tissue can provide valuable data, but are very complex and sometimes even impossible to perform due to limited cell size. To avoid this complexity of the native cell wall, apart computational methods of quantum chemistry the in vitro studies are conducted to help understanding the plant cell wall structure. One of the methods used for the study on model materials is the adsorption technique. 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. The approach proposed in the project will primarily contribute to the broadening of knowledge in the field of basic research (biology and agronomy) in the field of cell wall polysaccharide interactions. 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.

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Candidate:

- Master degree in chemistry, biology or related
- good command of English (written and spoken) ;
- basic knowledge of nanostructures synthesis, methods of surface characteristics, knowledge of molecular interactions, chemical reaction mechanisms and methods of chemical analysis
- ability to self-organization of work
- scientific achievements, ie. publications, patents, participation in scientific conferences are welcomed
- experience in conducting scientific research projects will be an advantage