

Defence announcement

Public Defence on 30 August 2024

Multifunctional materials from pectin

Title of the doctoral thesis	Pectin Based Multifunctional Porous Materials and Polymer Composites
Content of the doctoral thesis	Generally, bio-based materials, such as cellulose, starch, alginate, etc., have many advantages, including abundance, inexpensiveness, biodegradability, and non-toxicity. If we could use these materials as raw materials to fabricate functional materials and then explore new applications, it could accelerate the establishment of the new circular economy approaches. Pectin, as one of the bio-based materials, can be extracted from food wastes, such as fruit peels, sugar beet pulp, potato pulp, etc. However, there is an unbridged research gap for pectin to broaden the potential applications not only in the food industry. This thesis first deepens the understanding of the pectin material, so that a facilitated manipulation of pectin can be achieved for further fabrications. Then the directional freeze-casting followed by freeze drying method is employed to fabricate anisotropic pectin porous materials, which is further applied as the matrix to prepare polymer composites. As the final step, the produced pectin-based porous materials and polymer composites are demonstrated for multifunction. As an outcome, the anisotropic pectin porous materials present great functions including acoustic absorption and thermal insulation. The polymer composites from the pectin matrix perform unexpected optical transparency, UV blocking ability, and photothermal properties, which can be potentially applied as a construction material. In summary, this thesis attempts to give an overview of the attractiveness of pectin materials.
Field of the doctoral thesis	Chemistry
Doctoral candidate and contact information	M.Sc. (Tech.) Yujiao Dong yujiao.dong@outlook.com
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Remote defence	https://aalto.zoom.us/j/61185841853
Place of public defence	Aalto University School of Chemical Engineering, Lecture hall Ke2 (Komppa-Sali), Kemistintie 1, (main door at Biologinkuja) Espoo
Opponent(s)	Professor Carita Kvarnström, University of Turku, Finland
Custos	Professor Jaana Vapaavuori, Aalto University School of Chemical Engineering
Link to electronic thesis	https://aaltodoc.aalto.fi/handle/123456789/51
Keywords	Pectin, Bio-based materials, Porous materials, Bio-based composites, Multifunctional materials, Anisotropic materials