Defence of a Doctoral Thesis

Utilization of Cellulosic Biomass towards sustainable Chemicals and Novel Biomaterials

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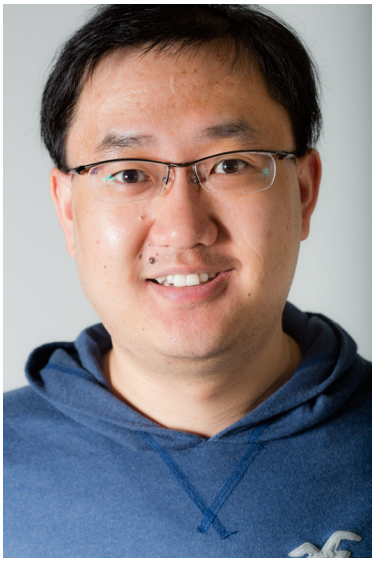
Abstract

It is predicted by the United Nations that by year 2030 the world will need at least 50 percent more food, 45 percent more energy and 30 percent more water. The emissions of carbon dioxide from combustion of fossil fuels and waste are also increasing. At the same time, the demand for natural resources has never been higher and the planet is under unprecedented stress. This increasing awareness and concerns also drive and accelerate the research to facilitate switching the fossildependent economy to biobased economy. In this premise, forest industry plays a significant role, from leading the sustainable development to providing more materials to meeting the expanding demand. Moreover, the forest industry is a crucial part of the solution to global warming. The utilization of forest product has a long history, and the efforts of converting the biomass into value-added products or innovative applications have never been more stimulated than now.



This thesis presents some examples of the exploration of lignocellulosic biomass based on the fractionation of lipophilic extractives and utilization of non-derivatized cellulose in novel materials. In the first part of thesis, the biorefinery of thermo-mechanical pulping (TMP) process water for lipophilic extractives was investigated as a way to extract the dissolved and colloidal substance (DCS). It was found that induced air flotation (IAF) combined with the foaming agent dodecyl trimethylammonium chloride (DoTAC) can efficiently remove the unwanted lipophilic extractives (Paper I) and retain valuable hemicelluloses (Paper II) in the TMP process water. By applying 80 ppm of DoTAC at a pH of 3.5 and 50 °C with induced air flotation, 94% of the lipophilic extractives were refined from the process water. The efficient biorefining of lipophilic extractives not only enabled the purification of TMP process water, but also facilitate the selective harvesting of hemicelluloses with very low impurities. Read the whole Abstract on the website **www.miun.se/fscn**

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Place	Campus Sundsvall C312 and Zoom
Supervisors	Professor Magnus Norgren Professor Håkan Edlund
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