

Isolation and Characterization of Cellulose Microfibrils from Hardwood using Sequential Subcritical Water Pretreatment and Formosolv Process

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In this work, cellulose microfibrils were isolated from tulip poplar sawdust with formic acid (formosolv) process followed by subcritical water pretreatment. In addition, the raw tulip poplar was treated using formosolv process as the same conditions applied for subcritical water pretreatment. Then, the chemical, thermal, structural and morphological characteristics, and yields of the fibrils resulted from each process were comparatively determined in order to assess the delignification capability of formosolv process on both substrates and to elucidate the influence of sub-critical water pretreatment on the properties of the fibrils. Chemical composition of the tulip poplar fibrils were confirmed that the glucan contents of the fibrils were increased up to 98% for raw and sub-critical water pretreated solids after formosolv process. It was apparent that subcritical water pretreatment provoked to a marked enhanced in the surface properties such as cumulative pore volume and accessible surface area, and crystallinity index of the fibrils during formosolv process.