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Improved diffusivity of NaOH solution in autohydrolyzed poplar sapwood chips for chemi-mechanical pulp production

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Abstract: This work investigated the changes in the physical structure of autohydrolyzed poplar sapwood chips and the effect on the subsequent alkali liquor diffusion properties for chemi-mechanical pulping (CMP). An alkali impregnation process was conducted by using the autohydrolyzed poplar sapwood with different levels of autohydrolysis intensity. The results showed that the volume porosity, water constraint capacity, and saturated water absorption of the autohydrolyzed poplar sapwood chips increased. Also, the effective capillary cross-sectional area (ECCSA) in the radial direction and the diffusion coefficients of NaOH solution in both the radial and axial directions all increased.

Autohydrolysis pretreatment enhanced the alkali liquor diffusion properties in poplar sapwood chips, and the diffusion coefficient was increased more greatly in the radial direction than that in the axial direction.

Keywords: Poplar sapwood chips; Autohydrolysis; Diffusion coefficient; Effective capillary cross-sectional area (ECCSA); Pore size distribution

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