

Augmented Retting Effect on Kenaf Fibers Using Alkalophilic Pectinase-Producing Bacteria in Combination with Water Solvents

ABSTRACT

A degumming approach is used in this paper with alkalophilic pectinase-producing bacteria (APPB) and two sources of water solvents to address the existing conventional water retting complexities of kenaf. The incorporation of APPB was confirmed based on their retting feasibilities and multiple cell-wall-degrading enzymatic delicacy. The combinations of APPB with seawater offered retting achievements within six-day retting in non-sterile conditions. These retting niches showed maximum (14.67 U/mL) pectinase activity with fiber separation feasibilities of 4.75 Fried test score. The yielded fiber composition analysis showed a higher cellulose composition (84.65%) and the least amount of hemicellulose, pectin, and ligneous gummy substances. The transmission electron microscopy scan of the yielded fibers showed smooth fiber surfaces, 84.20 μm fiber diameter, and 7.65 g/tex fine fiber compared with uninoculated and combinations of freshwater treatments. The FTIR spectra revealed the cellulosic discrepancies of the retting treatments by monitoring O-H and C=O stretching at $\sim 3300\text{ cm}^{-1}$ and $\sim 1730\text{ cm}^{-1}$ wavenumbers. These findings are compelling to yield kenaf fibers of quality considering the existing retting difficulties.