

Isolation of Alkalophilic Pectinolytic Bacteria and their Bio Retting Effect on Kenaf Fiber Compositions

ABSTRACT

Retting is the most limiting process of high-quality cellulosic kenaf bast fiber production which facilitating the separation of useable fiber from the plants' cell wall matrix. Existing traditional water retting approach confronts ineptitude and eutrophication related complications. Aiming to enhance the kenaf bio-retting process, sixty-seven alkalophilic bacterial colonies were isolated from paddy land soil sediments and kenaf retting water. These isolates were subsequently screened, of that two isolates were selected based on hyper qualitative and quantitative pectinolytic enzymatic measures. 16s rDNA gene sequence analysis revealed that both two strains were closely related to *Bacillus pumilus* species and designated as KRB56 and KRB22. These strains were applied in augmented non-sterile kenaf tank retting to investigate their kenaf retting efficiency and yielded fiber were analyzed for chemical compositions. Results revealed that, stains KRB56 and KRB22 significantly improve the retting process by degradation of 82.78% and 75.28% non-cellulosic gums, respectively comparing with uninoculated treatment niche (62.12%). These bacterial treated fiber samples showed thinner, smooth, and cleaner fibers surface morphology by SEM indicates sufficient non-cellulosic gums (NCGs) removal comparing with URKF. Moreover, yielded fibers were examined for chemical composition, FTIR, XRD test. Results revealed that compare to un retted and un inoculated kenaf fiber, bacterial treated kenaf fiber increases cellulose portions, and their crystallinity index increases 35.50-41.30 % due to sufficient NCGs removal. This study's findings indicate that isolated alkalophilic bacterial strains KRB56 and KRB22 were effectively to be used as kenaf bio retting agents to produce quality kenaf fiber.