

THE IMPACT OF ALKALI CONCENTRATION ON THE CHEMICAL EXTRACTION OF CELLULOSE FROM ANANAS COMOSUS LEAF

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Leaf of *Ananas comosus* or Pineapple is a prominent waste of pineapple processing plants. Its fibers primarily consist of carbohydrate polymers, including cellulose, hemicellulose, and lignin. Utilizing advanced processing techniques for pineapple leaves enhances cellulose production. This study explores the effects of different alkali concentrations on the properties of derived Alkali Treated Fibers (ATF) for cellulose production. Optimizing conditions for pineapple leaf cellulose extraction is crucial, highlighting its potential in eco-friendly packaging, bio-based composites, and textiles for various industries. The alkali treatment was carried out using different NaOH concentrations ranging from 0M, 0.1M, 1M, 2M, 3M, 4M, and 5M. Non-cellulosic components can be removed using this alkali treatment. However, Cellulose can be divided into hemicellulose when the reaction exceeds the optimum concentration. The resulting ATF were characterized by their moisture content, production yield, chemical composition, and functional groups. According to the experimental results, the moisture content and yield percentage of the ATF significantly decreased as the concentration was increased from 0M to 5M. Based on the chemical composition analysis, the 1M concentration resulted in 80.51% optimum cellulose content while obtaining the minimum content of hemicellulose and lignin. Also, elevated concentrations can cause cellulose chain breakage and degradation, reducing the yield. Moreover, FTIR (Fourier Transform Infrared) analysis revealed the effective removal of non-cellulosic components like lignin and hemicellulose by increasing the NaOH concentration. On the other hand, increasing the NaOH effect on the breakdown of the cellulose into hemicellulose forms. The overall findings suggest the importance of carefully altering the alkali concentration to achieve optimal cellulose production while minimizing degradation.

Keywords: *Pineapple leaf fiber, Alkali treatment, Cellulose extraction, NaOH concentration*