

**THE ANALYSIS OF *ARECA CATECHU L.* FIBER  
AS NEW ABSORBENT CORE FOR DISPOSAL  
BABY DIAPERS**

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## ABSTRACT

### THE ANALYSIS OF *ARECA CATECHU L.* FIBER AS NEW ABSORBENT CORE FOR DISPOSAL BABY DIAPERS

Areca Catechu L. is classified as an abundant plant in tropical countries, including Indonesia, Malaysia, and the Philippines. Currently, most baby diaper absorbent cores rely on synthetic polymers, which, along with the high operational costs of cotton extraction and wood pulp production, contribute to a significant carbon footprint. Currently, there is a challenge in producing affordable and eco-friendly baby diapers. To address this, the Areca Catechu L. composed of cellulose fibers, shows potential as an absorbent core for baby diapers due to its absorbency and abundance. In this study, a chemical extraction method, namely mild delignification using 10% peroxyformic acid and 4% sodium hydroxide, was utilized to extract cellulose fibers from Areca Catechu L. The extracted fibers were ground to obtain the desired size for the absorbent core. Moisture content tests revealed that Areca Catechu L. fibers contain 12.59% moisture. The morphological properties of the fibers were analyzed using Scanning Electron Microscope (SEM) for before and after treatment with 10% peroxyformic acid and 4% sodium hydroxide. The lignocellulose content (lignin, cellulose, hemicellulose, hydroxyl group) of untreated, first-treated, and second-treated Areca Catechu L. fibers was ascertained through Fourier-Transform Infrared Spectroscopy (FTIR) analysis. The hydroxyl group of untreated, first treated, and second treated were presence at peaks  $3414.74\text{ cm}^{-1}$ ,  $3401\text{ cm}^{-1}$ , and  $3430.92\text{ cm}^{-1}$ . The peaks that observed at  $2922.43\text{ cm}^{-1}$ ,  $2903.04\text{ cm}^{-1}$ , and  $2902.19\text{ cm}^{-1}$  indicates the -OH stretching in methyl and methylene groups from CH and CH<sub>2</sub> in the cellulose and hemicellulose components of untreated, first-treated, and second-treated areca nut leaf sheath fiber. Meanwhile, the peak observed at  $1536\text{ cm}^{-1}$  in untreated areca nut leaf sheath fiber is attributed to the aromatic ring present in lignin. The study found that the lignin, cellulose, and hemicellulose content of Areca Catechu L. fibers were 13.55%, 63.79%, and 15.0%, respectively. The treated areca nut leaf sheath fiber has smaller diameter and porosity than untreated areca nut leaf sheath fiber. Baby diaper performance tests including liquid strike, rewet test, and absorption capacity were conducted on the prepared diapers with different ratios of bamboo to Areca Catechu L. fiber. The observations indicated that the ideal ratio for the absorbent core was a 7:3 composite of bamboo to Areca Catechu L. fiber as it has excellent capability to absorb liquid and retain the moisture from leakage. Hence, Areca Catechu L. was found a good candidate as green fiber for development of baby diapers absorbent core.

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