

**EFFECT OF ALKALINE TREATMENT ON PROPERTIES OF  
CELLULOSE NANOFIBRIL ISOLATED FROM OIL PALM  
EMPTY FRUIT BUNCH (OPEFB)**

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## ABSTRACT

### THE EFFECT OF ALKALINE TREATMENT ON PROPERTIES OF CELLULOSE NANOFIBRIL ISOLATED FROM OIL PALM EMPTY FRUIT BUNCH (OPEFB)

Cellulose nanofibril (CNF) was isolated from oil palm empty fruit bunch (OPEFB) using two types of alkaline treatments which are sodium hydroxide, NaOH and potassium hydroxide, KOH and subsequently will sonicated for 1.5 and 3 hours each. The effects of alkaline and sonication time on properties of CNF were investigated. From the result obtained, it was observed that increasing sonication time will increases the percentage yield of isolated CNF and produce well dispersed suspension since no hydrogen bonding was formed. Result from IR spectroscopy shows that the functional group of hemicellulose and lignin at wavenumber  $1742.29\text{ cm}^{-1}$  and  $1240\text{ cm}^{-1}$  were completely removed during pretreatment and the purity of the compound can be confirmed through the presence of  $\beta$ -glycosidic linkages around wavenumber  $899\text{ cm}^{-1}$  for each alkaline treatment. Meanwhile, the nano size of CNF was proved using UV-Vis spectroscopy instrument indicating that all %T of CNF obtained was above 90% at wavelength 700 nm. High value of %T means that the CNF has smaller diameter size. This was supported by lightness value,  $L^*$  measured using chroma meter in which all CNFs has high  $L^*$  ( $>50$ ) means that the diameter size is smaller and increases the efficiency of scattering light. The morphology of the CNF was observed using scanning electron microscopy (SEM), showing rough surface of CNF for both NaOH and KOH. Rough surface means that the hemicellulose and lignin was successfully being removed by alkaline treatment.