

## **Biodegradability Effects on the PHA/NFC Nanocomposite**

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### ***Abstract***

Plastic has been harmful to the environment and lead to endless pollution due to years of disposal. However, its usage is undeniable hence an alternative to using biodegradable plastic replacing regular everyday plastic is highly recommended. Polyhydroxyalkanoates (PHA) have all characteristics needed as a biodegradable plastic however, it exhibits brittleness, poor thermomechanical properties, and low heat distortion temperature. Therefore, the objective was to investigate the effect of nanofibril cellulose (NFC) addition on the biodegradability properties of PHA composite. The biodegradation properties were investigated using a soil burial test. The samples were incubated for 7, 14, 21, and 28 days under control conditions, and weight loss for both characterizations was recorded to identify the effectiveness of NFC in the PHA composite. For the result, the weight of samples was decreased with an increase in incubation time, while its percentage of weight loss was increased as the hydrophilicity of NFC caused the sample to degrade at a higher rate. Although PHA/NFC samples were having a lag time at the earliest stage, it is then degraded better than pure PHA after 21 days. In conclusion, the addition of NFC has greatly improved PHA properties where PHA/NFC 8% is the most sufficient nanocomposite to turn PHA into promising biodegradable plastics and safe for daily usage

**Keywords:** Biodegradable plastic: Nanofibril Cellulose (NFC): Thin Film: Polyhydroxyalkanoates (PHA): Soil burial analysis.