

**Time-course analysis of chemical and physical properties of organic fertilizer from  
*Tithonia diversifolia* leaves**

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**Abstract**

Application of *Tithonia diversifolia* leaves as organic fertilizer is common in most rural regions in Africa. There is usually time period for curing between preparation and application stage. However, this curing period leads to reduction in fertilizer efficiency. This study aimed at analyzing the change in functional groups, particle morphology, size and elemental composition from preparation and application stages of *T. diversifolia* leaves as organic fertilizer. The fertilizer was synthesized from *T. diversifolia* leaves. The synthesized fertilizer was stored at room temperature and pressure conditions for a grace period of 5 days; as is norm. Characterization of the samples at the two stages was done by FT-IR (functional groups), SEM (morphology), TEM (particle size) and EDS (elemental composition). The results indicated reduction or complete loss of amine groups and carboxylic groups over this period. The fertilizer particles agglomerated over the storage period. Particle size increased from 112 nm to 133 nm diameter. There was a significant variation in the elemental composition between preparation and application time of the fertilizer samples. These findings prompt for better storage techniques to be used or reduction in curing and storage period of the fertilizers to minimize loss of plant nutrients. This study seeks to address the national big 4 agenda on Food Security and SDG 2 on zero hunger.

**Key words:** *T. diversifolia*, Organic fertilizer, Preparation, Application stage