Effects of Litter Decomposition of *Khaya grandfolia* and *Tectona grands* on Biogeochemical Cycle in the Ecosystem

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Abstract
This study is on the effect of litter decomposition of Khaya grandfolia and Tectona grandis on nutrient status of the soil at the forestry arboretum of Rivers State University, Nkpolu, Port Harcourt. A composite soil sample of 0-15cm depth was collected at various distances 30cm, 60cm and 100cm away from the standing tree. The soil samples collected were air dried and passed through a 2mm sieve for laboratory analysis. The analysis shows that there was significant increase in total nitrogen, potassium and Phosphorus in Khaya grandfolia than Tectona grandis at 100cm away from the tree.

Key Words: *Litter Decomposition, Khaya grandfolia, tectona grandis and Biogeochemical cycle*

Introduction

The accumulation and decomposition of plant litter is an important factors in controlling vegetation structure and ecosystem function (Wardle et al, 1997).
It is an important component of ecosystem functioning and nutrient cycling. (Jacob et al, 2014) litter accumulation provides ground cover and reduces soil erosion and water running in the soil (Row, 2006) it creates soil micro-environments that support seed germination of selected plant species and provides soil nutrient and resource pools (Thomas et al, 2011)
Nutrient concentration in plants controls the biogeochemical cycles, the amounts of nutrients taken up depends on the demand of plant species and also on availability of the nutrients in the soil (Abate, A. 2004). The leaf components of the plant is the most active and accumulate maximum amount of nutrients therefore, the input to the soil nutrient pool will be maximized by the litters in the vegetable. Leaf litter decomposition is important in agriculture because it adds organic matter to be soil thereby enriching the soil and enhancing (Hopkins, 2005) nutrient status such as nitrogen, potassium, phosphorus, total carbon. It is evident that without the decomposition of plant litter soil nutrient status will be affected leading to inability to support plant and agriculture in general.
Litter fall serves three functions in the ecosystem; energy input for soil micro flora and fauna, nutrient input for plant nutrient and material input for soil organic matter building up.

Justification

This research is aim at ascertaining the effect of litter decomposition of *Khaya grandfolia* and *Tectona grands* on soil quality.

Objectives

1. Determine the effect of litter decomposition of Khaya grand folia and Tectona Grands on soil nutrient status.
2. To ascertain the difference in litter decomposition of Khaya grand folia and Tectona grands in soil quality.

Materials and Methods

Soil sample collection: soil sample were collected at a depth of 0-15cm using soil auger borer at a distance of 30cm, 60cm and 100cm for *Khaya grandfolia* and *Tectona grandis*. The samples were bagged and transported to the laboratory for analysis.

Total Nitrogen- Total nitrogen was determined using micro kyeldah method, (1982) 1 gram of air-dried soil was weighed and mixed with a catalyst and sulphuric acid. It was digested and distilled and titrated with 0.0/N standard sulphuric acid and the result calculated. Available Phosphorus:- This was determine using Bray and Kurtz method. A 2.85g sample was taken and added to a 50ml flask with 4ml reagent solution and filled with distilled Hz0 and distillation factor taken.

Statistical analysis

The mean and standard deviation was used in statistical analysis.

And it was observed that *Khaya grand folia* had more nutrient status on the soil quality than *Tectona grandis* as shown on the tables below.

Result and Discussion

The result on the effect of litter fall decomposition of Khaya grand folia on soil quality shows that at a distance of 100cm away from the standing tree, the soil had more total nitrogen, available phosphorus and exchangeable potassium than at 60cm and 30cm away from the standing tree as shown on the table below.

Table 1: Mean+ standard deviation

Samples	Total N	Available phosphorus	Exchangeable potassium
100cm	0.144± 0.02	17.65±0.03	120±1.25
60cm	0.060±0.01	14.65± 0.55	101±2.01
30cm	0.08±0.03	15.54±0.04	112±1.01

Table 2: Mean+ standard deviation

Samples	Total N	Available phosphorus	Exchangeable potassium
100cm	0.135± 0.03	13.78±0.03	1.22±1.25
60cm	0.105±0.02	16.55± 0.04	1.05±1.01
30cm	0.0658±0.01	12.00±0.05	108±2.01

Conclusion

Organic matter management is essential to sustainable fertility and productivity of the ecosystem since the litter decomposition of *Khaya grand folia* is higher in soil nutrient status than *Tectona grandis*, it is necessary to plant more of the species as to aid in enhancing soil nutrient status, reducing erosion and aiding agricultural productivity in general.

Reference

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