



ENHANCEMENT OF GROWTH AND PRODUCTIVITY OF CUCUMBER (*Cucumis Sativus* L) CULTIVAR (MARKETER) THROUGH DIFFERENT APPLICATIONS OF ORGANIC MANURE

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ABSTRACT

The enhancement of growth and productivity of cucumber cultivar was studied. The experiment was conducted in the Teaching and Research Farm of Rivers State University, Nkpulu Oroworukwo, Port Harcourt; in the rainforest region of southern Nigeria (40 48.N 60 58.E) a humid tropical area with an elevation of 21m above sea level. The study was conducted between April and June, 2019.. Organic manures (poultry manure, wood ash manure and combination of poultry and wood ash manure) was applied to the cucumber (Marketer) with a control (no treatment) replicated three times and arranged in a randomized complete block design. The result showed that the organic manure significantly enhanced the number of leaves, vine length and number of flowers per plant. However, no significant enhancement on leaves area per plant by the three treatments on the cucumber variety was shown. Furthermore, the productivity showed that only cucumber variety treated with poultry manure and combination of poultry wood ash manure, produced fruits with weight (2.52g and 1.51g) respectively, consequently, according to the result of the analysis, marketer variety treated with poultry manure and combination of poultry wood ash manure had yield. Therefore, it is recommended that marketer variety of cucumber should be considered by farmers within the study area and treatment of this variety with poultry manure and combination of poultry and wood ash manure should be applied for enhanced yield.

Kew words; Cucumber cultivar, Enhancement, Growth, Productivity, Organic manure,

1.0

INTRODUCTION

Cucumis sativus (commonly “cucumber”) is a member of the Cucurbitaceae family and widely consumed worldwide as a fresh vegetable and in salads. Cucumber (*Cucumis Sativus* L.) is an ancient vegetable and one of the most important members of Cucurbitaceae family (Thoa, 1998) that is cultivated for its fruit which is a rich source of mineral and vitamins. The fruit is eaten fresh in salads in accompaniment with other vegetables. It has exceptionally high water



content (90–95 %) and low caloric content, making it a refreshing and hydrating dietary component. Raw cucumber (with peel) provides 16 kcal per 100 g and contains primarily water and carbohydrates, with very low fat and modest protein content. Vitamin K is notable among its micronutrients, while other vitamins and minerals are present in smaller amounts. (Wikipedia, 2025)

Proximate analyses in agricultural studies confirm that cucumber fruit flesh contains 90 % moisture, 1 % protein, 1 % fiber, and minimal lipid content, with ash and soluble solids constituting the rest of the composition. (Borecka *et al.*, 2025) Beyond basic nutrients, cucumbers contain a range of bioactive phytochemicals including flavonoids, tannins, cucurbitacins, terpenoids, and phenolic glycosides. These compounds are linked to antioxidant, anti-inflammatory, and potential chemo preventive effects. Their presence in both fruit and seeds contributes to the functional food status of cucumber. The seeds and skin also contain phytosterols and phenolic fractions that may reduce cholesterol and support cardiovascular health in experimental systems. (Mukherjee, 2013)

Cucumber's high water content promotes hydration, supports weight management (via low calorie intake), and contributes to satiety. (Wikipedia, 2025)

Phytochemicals in cucumber exhibit antioxidant capacity, potentially reducing oxidative stress and related chronic disease risk. Some flavonoids and tannins are highlighted for anti-inflammatory action. . (Mukherjee, 2013)

Experimental studies suggest that certain extracts of cucumber may modulate glucose metabolism and exhibit hypoglycemic effects in animal models, possibly through enhanced insulin activity and glucose utilization pathways. (Agatamor *et al* 2018)



Traditional use and some pharmacological literature note soothing effects on the skin, including relief from sunburn and irritation — attributed to both water content and specific phytoconstituents. (Mukherjee, 2013)

The soil where cucumber is cultivated require moderate to high nutrient level so as to achieve high yields. Cucumber (*Cucumis Sativus* L.) is a nutrient demanding crop and perform poorly on nutrient deficient soils leading to low yields, better and misshapen fruits (Grubben and Denton, 2004). Infertile soils result in bitter and misshapen fruits which are often rejected by consumers thereby reducing farmers income.

Cucumber is thought to be one of the oldest vegetables cultivated by man historical records dating back 5,000 year (wehner and Guner,2004). In Asia the crop is the fourth most important vegetable after tomato, cabbages and onion (Tatlioglu, 1997) and the second most important after tomato in western Europe (Phu, 1997). The need for renewables forms of energy and reduced cost of fertilizing crops, have revived the use of organic manures worldwide (Ayoola and Adeniran, 2006). Improvement in environmental conditions and public health are also important reasons for advocating increased use of organic materials (Ojeniyi, 2000; Maritus and Vleic 2001). Organic manures can sustain cropping systems through better nutrients recycling and improvement of soil physical attributes El-Shakweer *et al* 1998). In order to sustain high yield of cucumber, there is need to augment the nutrient status of the soil to meet the crops need, thereby maintaining soil fertility. Organic manure acts as an alternative source of fertility enhancement for inorganic fertilizers as they release nutrients slowly and steadily over longer periods of time and also improve the soil fertility status by activating the soil microbial biomass (Ayuso *et al*, 1996; Belay *et al*, 2001).



The aim of the study was to assess the enhancement of growth and productivity of cucumber cultivar using organic manures (poultry manure, wood ash manure and combination of poultry and wood ash manure)

2.0 MATERIALS AND METHODS

2.1 Experimental Location

This experiment was conducted in the Teaching and Research Farm of Rivers State University, Nkpolu Oroworukwo, Port Harcourt; in the rainforest region of southern Nigeria (40 48.N 60 58.E) a humid tropical area with an elevation of 21m above sea level. The study was conducted between April and June, 2019.

2.2 Source of Cucumber Seeds

The cucumber(marketer) seeds were sourced from France, imported and distributed by Technicism company Ltd while the organic manure was sourced locally in rivers state Nigeria.

2.3 Experimental Lay out and Treatments

The 4x1 factors of this experiment are; 4 types of organic manure -factor 1, one cucumber variety -factor 2

Cucumber cultivar

Marketer variety

Treatments

Poultry manure

Wood ash

poultry manure and wood ash

control



2.4 Cultural Practices

the manure was manually applied to the plant using 0.5kg par hole one week before planting and the cucumber seeds were planted two seed par hole at (2cm depth) and a spacing of 1m x 0.5m between and within the rows, this brought the plant population to 20,000 plant par hectare .Weeding was done manually by hand pulling after planting whenever they appear and by hole 4 weeks after planting to keep the plot weed free

2.5 Data collection

The study of the enhancement of the growth and productivity of the cucumber cultivar (marketer) commenced two weeks after the seedlings emerged. The growth variables measured fortnightly included; the number of leaves, leaf area, vine length, number of flowers, number of fruits and at the end of the experiment the weight of the fruits was recorded.

2.6 Experimental design and Statistical analysis

The experimental design was the randomized complete block design. There were four treatments and three replicates per treatment each having 5 sample plant per rep making a total of 15 plants in the three replications per treatment.

Data collected were analyzed using descriptive statistics of frequency and percentages summarized on tables and inferential statistics, using analysis of variance (ANOVA) at 5% level of significance. The Least significant difference (LSD) test was used to separate the means of the variables that were significant.



3.0

RESULTS AND DISCUSSION

3.1 Effect of Organic Manure on Growth Component of Cucumber Cultivars

The effect of organic manure on growth component of cucumber is shown in Table 1. the result for the number of leaves per plant, which was significantly ($P < 0.05$) influenced by the three organic manure treatments for Marketer. This aligns with the report of Agbede *et al* (2008)

It is also seen from the analysis that treatment for Marketer variety with wood ash manure produced the highest area of leaf per plant, it shows that organic manure can induce growth of cucumbers. It also shows that organic manure can significantly ($P < 0.05$) influenced the weight of cucumber fruit. The above agrees with the report of Awodun *et al* (2007). Effect of Oil palm Bunch refuse ash on soil and plant nutrient composition and yield of maize.

It was also observed that the vine length for marketer specie when treated with poultry manure was 11.11cm. the result shows that soil treatment with organic manure can enhance the growth of cucumber in the study area.

From the result, the increase in the yield component of cucumber could be attributed to the nutrients made available from organic manure. Most notably from the results poultry manure showed to be very significant to the growth of Marketer variety of cucumber. Also, the combination of wood ash and poultry manure showed a significant influence the yield component of Marketer variety of cucumber

Research into plant physiology and cultivation confirms that *C. sativus* requires good soil water and nutrient management, and it responds to foliar treatments and fertilizers that can affect not only yield but also proximate composition of the fruit. (Nnadi *et al*, 2025)

The above is further corroborated by the report of Grubben and Denton, (2004) that the soil where cucumber is cultivated require moderate to high nutrient level so as to achieve high



yields. Cucumber (*Cucumis Sativus L.*) is a nutrient demanding crop and perform poorly on nutrient deficient soils leading to low yields, bitter and misshapen fruits Infertile soils result in bitter and misshapen fruits which are often rejected by consumers thereby reducing farmers income ,alluding to the fact that fertile soils should be provided

Table 1 Effect of Organic Manure on Growth Component of Cucumber Cultivars

Cucumber Variety	Manure Type	Number of Leaf per plant	Leaf area per plant (cm ²)	Vine length per plant (cm)	Number of Flower	Number of fruits	Weight of fruits
Marketer	Poultry manure	5.29	114.90	11.11	14.3	6.8	2.52
	Wood ash	6.4	106.27	2.73	4.1	3.2	2.2
	Poultry manure and wood ash	7.26	106.10	2.81	5.6	5.4	1.51
	Control	3.11	118.27	6.7	4.5	6.7	3.2
LSD (0.05)		1.971*	856.061	3.016*	8.187*	9.327	2.234*

LSD Least Significant Difference

4.0 CONCLUSION AND RECOMMENDATIONS

4.1 Conclusion

The combination of wood ash and poultry manure showed a significant influence on the yield component of Marketer variety of cucumber. The study has clearly revealed that the growth of cucumber can be precipitated by the application of poultry manure found within the environment and farmers will be encouraged to apply this application in their cropping practice.

4.2 Recommendations

- i It is recommended that Marketer variety of cucumber should be considered by farmers within the study area
- ii Treatment of this variety with poultry manure to enhance its yield.



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