

Effect of Chicken manure on leaf yield of selected African leafy vegetables in western Kenya

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Introduction

- ALVs important for health food security and income
- ALV require sufficient fertilizer for good yields
- The artificial is not affordable to small-scale farmers
- Chicken manure can be a source of fertilizer because chicken rearing is a common practice in western Kenya and therefore the manure should be easily accessible.
- Suitability of chicken manure produced by small holder farmers and effect of chicken manure on ALVs production in western Kenya not known

Objectives

1.) To investigate the presence of parasitic nematodes, pathogenic bacteria and fungus; 2). To determine the nutrient contents in chicken manure samples collected from small scale-farmers in western Kenya and 3). To demonstrate the effect of the chicken manure on leaf yields of selected ALVs in in western Kenya

Materials and Methods

- Study was conducted in Busia, Kakamega and Vihiga counties in 2018 and 15 farmer groups participated (5 groups per county)
- Local chicken manure samples (1-2 kg) were collected from farmer groups participating in the project and tested for parasitic nematodes; pathogenic fungi (*Fusarium species*) and bacteria (*Ralstonia solanaceaurum*); and nutrient at KALRO Nairobi
- On farm trials were conducted having two sets of trials of spider plant (*Cleome gynandra*), amaranth (*Amaranthus spp.*), African nightshade (*Solanum spp.*), cowpea (*Vigna unguiculata*) and slender leaf (*Crotolaria brevidense*).
 - one set had 10 MT/ha of manure and the second 0 MT/ha of chicken manure collected from farmer groups .
 - The experiment design was RCBD replicated three times.
 - Plot sizes were 9 m².
 - Spacing for spider plant, amaranth and slender leaf were the same at 50 by 25 cm. The African nightshade spacing was 50 by 40 cm and the cowpea was 50 cm by 10 cm.
 - Data were collected on plant height, fresh and dry weights of leaf yields at 56 days after planting.

Results

- 1.No parasitic nematodes, nor the pathogenic *Ralstonia solanaceaurum* bacteria were found in the chicken manure sample However, 44% of the samples had the pathogenic *Fusarium sp.* Fungus
2. Results of nutrient analysis (Table 1) show that samples from Vihiga had the highest average nutrient contents for nitrogen, potassium, magnesium, iron, manganese and zinc; Kakamega for phosphorus and Busia for calcium and copper.
3. Leaf yields from plots with chicken manure (10 t ha⁻¹) were significantly (P<0.05) higher than those without manure (0 t ha⁻¹) in spider plant, Amaranth and African nightshade, but not in slender leaf and cowpea in all the three sites (Table 2).

Table 1 Nutrient contents in the chicken manure samples from Kakamega, Vihiga and Busia Counties

Nutrient	Kakamega			Vihiga			Busia		
	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
Nitrogen%	1.05	1.06	1.37	1.05	2.10	1.77	0.97	2.56	1.73
Phosphorus%	0.46	2.84	0.98	0.44	0.67	0.56	0.36	0.52	0.45
Potassium%	0.60	2.47	1.43	1.44	3.22	2.10	1.05	2.07	1.41
Calcium%	0.03	1.18	0.92	0.05	0.33	0.16	0.05	0.98	0.39
Magnesium%	0.02	0.72	0.36	0.27	0.77	0.47	0.29	0.48	0.38
Iron mg/kg	2422	47301	17948	22667	39768	33754	11934	26801	20497
Copper mg/kg	13.3	5.0	27.32	20	35	27.7	10	86.7	34
Manganese mg/kg	222	1373	621	593	3833	1548	282	635	418
Zinc mg/kg	15.3	345	201	182	292	241	98.3	370	191

Table 2. Leaf yields (t ha⁻¹) of ALVs with and without chicken manure application

Treatments	leaf yield (t ha ⁻¹)				
	African nightshade	Amaranth	Slender leaf	Spider plant	Cowpea
Manure 0 t ha ⁻¹	1.680b	1.46b	2.18a	0.42a	6.48a
Manure 10 t ha ⁻¹	3.130a	7.21a	2.43a	4.83b	11.61a
Mean	2.41	4.47	2.31	2.62	8.92
LSD	1.37	3.88	1.37	1.66	7.04
CV	60.1	94.2	64.4	70.8	85.6

Means with the same letters within each species are not significantly different at P=0.05

Discussion

1. Absence of parasitic nematodes and *Ralstonia solanaceaurum* in the chicken manure implied that soil and plant infection on farms of participating farmers by the bacteria through the manure was limited.
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3. leaf Yields realized for nightshade, spiderplant and high were high compared to the reported 1.3-1.5 tonnes per hectare in Kenya (Ekhuya *et al* 2018). The lack of difference in the leaf yields of slender leaf and cowpea when with and without chicken manure could be due to the nitrogen fixing ability of these species

Conclusion

Chicken manure contributed to the increase of leaf yields of nightshade, Amaranth and spider plant but not cowpea and slender leaf



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