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EFFECT OF INORGANIC AND ORGANO-MINERAL FERTILIZERS ON SOIL PROPERTIES AND NUTRIENT COMPOSITION OF PEPPER (*Capsicum spp.*)

F. A. OLOWOKERE

Department of Soil Science and Land Management,
Federal University of Agriculture, Abeokuta, P.M.B. 2240, Postcode 110001. Nigeria
Corresponding author: olowoflo@yahoo.com

ABSTRACT

Screen house and field experiments were conducted in Abeokuta, south western Nigeria in 2006 and 2007 to determine the effects of different rates of inorganic and organo-mineral fertilizers (OMF) on soil chemical properties and nutrient composition of pepper. The effect of independent application of OMF at different rates and chemical fertilizer (CF) was investigated in the screen house. The experimental method was completely randomized design (CRD) with the following treatments: 0, 2, 4, 6, 8, 10, 12, 14 t/ha organo-mineral fertilizer (OMF) and chemical fertilizer (CF) at the rate of 60 kg N, 19.8 kg P, 39.6 kg K/ha. Based on the results obtained from the screen house study, the following treatments arranged in a randomized complete block design (RCBD) were used on the field: 12 t/ha organo-mineral fertilizer (100 % OMF); chemical fertilizer at 60 kg N, 16.9 kg P, 39.6 kg K/ha (100 % CF), OMF + CF (50:50), OMF + CF (25:75), OMF + CF (75:25). Parameters evaluated in the screen house were: nitrogen, phosphorus, potassium, pH and organic carbon contents of post-planting soil as well as number of days to 50 % flowering, fruiting and ripening, yield and vitamin C content of pepper. In addition to the above, nitrogen, potassium and phosphorus contents of pepper fruit were also assessed on the field. In the screen house, application of 12 t/ha organo-mineral fertilizer increased the potassium and organic carbon contents of post planting soil to the maximum (0.03 cmol/kg and 15.8 g/kg respectively). It also enhanced the fruiting and ripening of pepper and increased the vitamin C content (48 days, 94 days and 8.78 mg/100g respectively). On the field, application of OMF + CF (75:25) increased the vitamin C in pepper in both years (7.20 and 2.60 mg/100g) as well as nitrogen content in pepper fruit (22.5 g/kg) in 2006. The concentration of phosphorus in pepper fruit in 2007 was highest (3.5 mg/kg) by the above fertilizer rate while OMF + CF (50:50) and 100 % CF increased the potassium content to 61 and 31.7 mg/kg in 2006 and 2007 respectively. Number of days to 50% pepper ripening was significantly reduced to 120 by the application of OMF + CF (25:75) and OMF + CF (75:25) against 130 days in the control in 2007. Application of 100% OMF improved the phosphorus content of post planting soil in 2006 and 2007 (10.8 and 7.1 mg/kg respectively) while the highest pH (7.4) which is significantly higher than the control was observed on plots treated with the above fertilizer rate in 2006. Pepper could be grown with 100% OMF, OMF + CF (25:75), OMF + CF (75:25) or OMF + CF (50:50) for improved yield, growth, nutrient composition and improved soil quality.

Keywords: Nutrient, Pepper, Flowering, Fruiting, Ripening, Southwestern Nigeria

INTRODUCTION

Nigeria, which accounts for about 50 % of total Africa's pepper production, has been identified as the largest producer of pepper

in the continent (Adamu *et al.,* 1994). Pepper production is largely dependent on the use of inorganic fertilizers (Bosland and Vostava, 2000), however, the use of inorganic fertilizer has been reported to cause soil acidification, reduced soil organic matter content and soil physical degradation (Avery, 1995, Doran *et al.,* 1996). Using organic manure, high rate of 30 t/ha has been recommended for increased crop production (Kekong *et al.,* 2010). Thus sufficient quantities could not be easily sourced to satisfy the requirements of crops grown on fragile, low nutrient and organic matter level Nigeria soils (Chude, 1999). In addition, it has been established that neither inorganic fertilizer nor organic manure can solely supply all the nutrients and other conditions of growth for producing crops that can feed Nigeria's population (Uvobisere and Elemo, 2000). Hence, there is the need for research to arrive at alternatives to boost crop production. Organo mineral fertilizer, comprising organic manure fortified with mineral fertilizer, constitute an alternative that has not been adequately exploited especially as it affects pepper production. Using organo-mineral fertilizer, there is the reduction in the quantities of organic manure and chemical fertilizer needed for optimum crop production. Therefore, there is the need for evaluation of commercially produced organo-mineral fertilizers with a view to finding out if the combination is in the right proportion capable of addressing the problem of bulkiness. The objective of this experiment was to determine the effect of pacesetter organo-mineral and chemical fertilizers and their combinations on the chemical properties, growth, yield and quality of pepper.

MATERIALS AND METHODS

Screen house experiment

The screen house study was carried out in the College of Plant Science and Crop Production, Federal University of Abeokuta, Nigeria. Pepper nursery was prepared by filling a wooden box with length 3 m, breadth 2 m, and depth of 2 m with topsoil and broadcasting pepper seeds. Water (500 mls) was applied every other day till 3 weeks after planting when watering was done daily, weeds were removed with hand. At 4 weeks after nursery establishment, twenty one liter buckets perforated at the bottom and with saucers were filled with fifteen kilogram top soil, treatments applied were: organo mineral fertilizer obtained from Pace setter organo-mineral fertilizer plant, Bodija, Ibadan at the rate of 0, 2, 4, 6, 8, 10, 12 and 14 t/ha. Pepper seedlings were transplanted at 6 weeks after nursery establishment, chemical fertilizer at the rate of 60 kg N, 19.8 kg P and 39.6 kg K/ha was applied at one week after transplanting. The experiment was arranged in a Randomized Complete Block Design (RCBD) and replicated four times. The numbers of days to 50 % flowering, fruiting and ripening were observed by counting the number of days from pepper planting to the day three out of six plants per treatment flowered, fruited and ripened. Pepper fruits were harvested for vitamin C determination.

At the end of the experiment, soil in each pot was pulverized and sampled, these were air dried and sieved with 2 mm and 0.5 mm sieves for the analysis of nitrogen, phosphorus, potassium, pH and organic carbon.

Field Experiment: The field experiment was carried out at the Teaching and Research Farm of the Federal University of Agriculture, Abeokuta (latitude 7° 17´ N and longitude 3° 26´ E), Nigeria. The area has two

distinct seasons; the wet season (April – September) and dry season (November – March). Alfisols dominate the landscape while Inceptisols and Entisols could be found at the lower slope position (Ahn, 1970). Pepper seeds (*Capsicum frutescens*) were sown in the nursery by breaking soil clods and broadcasting on a 4 m x 4 m plot. This was adequately watered and mulched. The mulching material was removed at two weeks after planting and a shed was erected on the seedlings to prevent them from direct raindrops and sunshine effects. At five weeks after planting, the seedlings were hardened up by gradually removing the shed.

The experimental site was mechanically cleared. Pre-planting soil (0 – 15 cm) was collected with the aid of a soil auger for routine analysis. Plots, 10 m x 5 m dimensions were marked with pegs. There were six plots in a row and these were replicated three times. Treatments applied were: control (no fertilizer); 12 t/ha (24 kg /plot) organo-mineral fertilizer (100 % OMF); 60 kg N, 19.8 kg P and 39.6 kg K/ha (260.86g urea, 440g SSP, 158.4 g KCl/plot) (100% CF); OMF + CF (50:50) (12 kg OMF + 130.43g urea, 220g SSP, 79.2g KCl/plot); OMF + CF (25:75) (6kg OMF + 195.64g urea, 330g SSP, 118.8g KCl/plot); OMF + CF (75:25) (18kg OMF + 65.21g urea, 110g SSP, 39.6g KCl/plot). Treatments were arranged using Randomized Complete Block Design (RCBD) with three replicates. Combination of organo-mineral and chemical fertilizers were applied at two weeks before pepper seedling transplanting by broadcasting and thorough mixing with the topsoil (0 – 15 cm layer), chemical fertilizer was applied one week after transplanting. At six weeks after planting, pepper seedlings were transplanted at the rate of two seedlings per hole and spacing of 1m x 0.5m on the 17th of June and 26th of May in 2006 and 2007 respectively. Pest infestation was controlled by spraying 2.5 KARATE EC (active ingredient: lambda- cychlothrin 50 g/l) at the rate of 400 ml/ha with the aid of a knapsack sprayer, this was done one week after transplanting and during flower initiation stage. Weed was manually controlled at four and eight weeks after transplanting.

Data collection: In addition to the parameters observed in the screen house, pepper fruits were analyzed for nitrogen, phosphorus and potassium concentrations. Ten plants were tagged at the middle of each plot for data collection. Data collected were: the number of days to 50 % flowering, fruiting and ripening of the tagged plants. Fruits from the plants were also harvested for yield, nitrogen, phosphorus, potassium and vitamin C concentration determinations.

Top soil samples were collected at four points from each plot with the aid of a soil auger, these were composited, air dried and sieved with 2 mm and 0.5 mm sieves for pH, nitrogen, phosphorus, potassium and organic carbon determination.

Determination of vitamin C content in pepper fruit was carried out by homogenizing 10 g of green pepper fruit sample in 100 ml of metaphosphoric acid, the mixture was filtered and the filtrate titrated with 2, 4, 6-Dichlorophenol-indophenol solution to a rose pink end point (Boyer, 1993).

Determination of nitrogen, phosphorus and potassium concentrations in pepper fruits was done by oven drying the fruits at 60º C to constant weight before milling and total Nitrogen in sample was determined by Kjeldahl method. Phosphorus and potassium

were determined by dry ashing the sample in a furnace at 500º C, the ashed sample was washed with 1N HCl and filtered. Phosphorus was determined by vanado-molybdate method while potassium was read on a flame photometer (corning 410 model) (IITA, 1979).

Soil Analysis: pH was determined with the aid of glass electrode pH meter (Mclean, 1982), organic carbon by wet oxidation Walkley- Black method (Nelson and Sommers 1996), nitrogen by Kjeldahl method (Bremner 1965) phosphorus by Bray 1 method (Bray and Kurtz 1945), and potassium by flame photometry (Jackson 1964).

Data collected was subjected to the Analysis of Variance (ANOVA) using the Statistical Analysis Systems package (SAS Institute 1990) and means were separated using Duncan's Multiple Range Test (DMRT) at 5% probability level.

RESULTS AND DISCUSSION

Pre-planting Soil and Fertilizer Characteristics

The chemical and physical characteristics of the soil used for this study before planting is shown in Table 1. The pH was neutral, organic carbon, nitrogen, phosphorus and potassium contents were low (Sobulo and Osiname, 1981; Adeoye and Agboola, 1985). This showed the need for fertilizer application on the soil for maximum crop yield. Textural class was sandy loam. The organo-mineral fertilizer used for the experiment was slightly alkaline, organic carbon content was medium, nitrogen, phosphorus and potassium contents were low (Table 1).

Table 1: Pre-planting soil and Organo-mineral Fertilizer characteristics

Property	Soil	Organo-mineral fertilizer
	Value	
pH (1:1 H2O)	7.1	7.93
Organic carbon (g/kg)	8.0	20.0
Phosphorus (mg/kg)	4.5	0.01
Total Nitrogen (g/kg)	0.8	5.0
Potassium (mg/kg)	0.01	0.15
Calcium (cmol/kg)	3.32	0.06
Magnesium (cmol/kg)	2.40	57.5
Sodium (cmol/kg)	0.15	0.14
	Particle Size Analysis	
Sand (%)	85.8	-
Silt (%)	3.6	-
Clay (%)	10.6	-
Textural Class	Sandy loam	-

Screen house experiment

Flowering, fruiting and ripening of pepper: Table 2 shows the number of days to 50 % flowering, fruiting and ripening of pepper fruits as influenced by inorganic and organo-mineral fertilizers in the screen house. Application of organo-mineral fertilizer at the rate of 6, 8, 10, 12, 14 t/ha and inorganic fertilizer significantly ($P<0.05$) reduced the number of days to 50 % flowering and fruiting compared to plants without fertilizer. Plants with the application of inorganic fertilizer flowered earlier (44 days) while fruiting was significantly ($P<0.05$) enhanced compared to the control by fertilizer application with the exception of OMF at 2 and 4 t/ha. Minimum number of days (94) to 50 % ripening was observed in plants with the application of 12t/ha organo-mineral fertilizer.

Table 2: Effect of chemical and different rates of organo-mineral fertilizers on the number of days to 50% flowering, fruiting and ripening of pepper fruits in the Screen house

Treatment /ha	Number of days to 50 % flowering	Number of days to 50 % fruiting	Number of days to 50 % ripening
Control	53a	62a	111a
OMF @ 2t	52ab	60ab	102abc
OMF @4t	52ab	60ab	102abc
OMF @ 6t	48c	54b	103abc
OMF @ 8t	48c	54b	108ab
OMF @10t	47cd	52c	96c
OMF @12 t	47cd	48c	94c
OMF@ 14 t	47cd	51c	101abc
CF@ 60 kg N, 16.9 kg P & 39.6 kg K	44d	53bc	100bc

Means followed by the same letter(s) in a column are not significantly different from each other at $P>0.05$

OMF – Organo-Mineral Fertilizer CF- Chemical Fertilizer

This is similar to the findings of Javanmardi (2012); Liu and Liu (2012) who reported that the fruit set and ripening and maturity of pineapple were promoted by the application of organic fertilizer. The minimum number of days to flowering observed in plants treated with inorganic fertilizer was due to the immediate release of nutrients characteristic of inorganic fertilizers, nutrients contained in organic fertilizers are reported not to be immediately made available to plants after application (Bi et al., 2010). Also, pepper plants benefited nutritionally from the gradual release of nutrients from OMF (SadiqueShaik and Patil, 2013), this is evident by the minimum number of days to pepper fruit ripening observed on plants treated with 10 and 12 t/ha OMF, additionally the high rate of OMF (10 and 12 t/ha) was as a result of the low nutrient status of the soil used for the experiment whereby a high fertilizer rate would be required for pepper production (Delahaut and Newenhouse, 1997).

Vitamin C content: The application of organo-mineral fertilizer at 6, 8, 10 and 12 t/ha significantly ($p<0.05$) promoted the vitamin C content of pepper fruits over the control. The highest value (8.78 mg/100g) was observed on pepper fruits treated with 12 t/ha organo-mineral fertilizer followed by this was pepper fruits treated with 10 t/ha organo-mineral fertilizer (7.50 mg/100g), the least value (4.42 mg/100g) was observed on pepper fruits without fertilizer application (Table 3). Similar results were observed by Hassan et al., (2012) and Chaturvedi and Kumar (2012) who reported that organic fertilizer improved the vitamin C contents of *Cosmos caudetus* and tomato respectively. The effect of inorganic and organo-mineral fertilizers on the chemical properties of post planting soil in the screen house is shown in Table 4. Fertilizer application significantly ($P<0.05$) increased the nitrogen (N) content above the control plot.

Table 3: Vitamin C content of pepper as influenced by inorganic and Organ mineral fertilizers in the Screen house

Treatment/ha	Vitamin C (mg/100g)
Control	4.42b
OMF @ 2 t	6.21ab
OMF @ 4 t	6.50ab
OMF @ 6 t	7.22a
OMF @ 8t	7.33a
OMF @ 10 t	7.50a
OMF @ 12 t	8.78a
OMF @ 14 t	6.21ab
CF @ 60 kg N, 16.9 kg P & 39.6 Kg K	6.39ab

Means followed by the same letters in a column are not significantly different from each other at $P>0.05$

OMF – Organo-mineral Fertilizer CF – Chemical Fertilizer

Table 4: Effect of inorganic and organo-mineral fertilizers on the chemical properties of post planting soil in the screen house

Fertilizer treatment/ ha	Nitrogen g/kg	Phosphorus mg/kg	Potassium cmol/kg	pH(H_20)	OC. g/kg
Control	0.8d	4.2e	0.02ab	7.10b	11.7c
OMF @ 2 t	1.6bc	4.4de	0.02ab	7.28ab	13.7abc
OMF @ 4 t	1.7ab	4.8de	0.02ab	7.26ab	14.1ab
OMF @ 6 t	1.9a	4.0e	0.01b	7.24ab	14.2ab
OMF @ 8t	1.5c	6.2de	0.02ab	7.26ab	14.3ab
OMF @ 10 t	1.7ab	7.0bc	0.02ab	7.30a	14.6ab
OMF @ 12 t	1.9a	8.3ab	0.03a	7.30a	15.8a
OMF @ 14 t	1.6bc	7.6ab	0.02ab	7.21ab	14.5ab
CF @ 60 kg N, 16.9 kg P & 39.6 kg K	1.7ab	9.0a	0.01b	7.09ab	12.3bc

Means followed by the same letters in a column are not significantly different from each other at P>0.05

OMF – Organo-mineral Fertilizer CF – Chemical Fertilizer

Increase in N content follows this order of fertilizer application: OMF at 6 and 12 t/ha > OMF at 4 and 10 t/ha, CF > OMF at 2 and 4 t/ha > OMF at 8 t/ha > control. Application of CF and OMF at 10, 12 and 14 t/ha significantly (P<0.05) increased phosphorus (P) level when compared with the control and other fertilizer levels, while potassium (K) was significantly (P<0.05) reduced by CF application when compared with plots with the application of OMF at 12 t/ha. The highest pH value (7.30) was recorded on OMF (10 and 20 t/ha) plots, this value is significantly (P<0.05) higher than the control plot value (7.10). Organic carbon content ranged from 11.7 to 15.8 g/kg. Fertilizer application with the exception of OMF at 2 t/ha and CF significantly (P<0.05) increased the organic carbon content over the control which had the least value of 11.7 g/kg, organo-mineral fertilizer was reported to have a positive influence on soil organic carbon and pH (Makinde et al., 2009). Most of the post-planting soil parameters excelled on plots where OMF at the rate of 12 t/ha was applied, this rate is probably the optimum application rate for the soil used for this experiment.

Field experiment

Flowering, Fruiting and Ripening of pepper fruit:

In 2006 planting season, pepper flowering and ripening were not significantly affected by fertilizer application while pepper fruiting was significantly ($p<0.05$) affected. Number of days to 50% fruiting ranged from 65-77, pepper plants with the application of OMF+CF (75:25) fruited earlier than ones without fertilizer. In 2007, the minimum number of days to flowering and fruiting were given by plants with the application of 100% CF and OMF+CF (75:25) (57 and 70 respectively), while the application of OMF + CF (25:75) and OMF + CF (75:25) significantly ($P<0.05$) enhanced pepper ripening, (120 days) above control and other fertilizer treated plants (Table 5).

Table 5: Effect of Inorganic and Organo-Mineral Fertilizers applied at varying levels on the number of days to 50 % flowering, fruiting and ripening of pepper plants on the field.

Treatment/ha	Year	No. of days to 50 % flowering	No. of days to 50 % fruiting	No. of days to 50 % ripening
	2006			
Control		62	77a	141
100% OMF (12 t)		55	68ab	126
100 % CF (60 kg N, 19.6 kg P, 39.6 kg K)		53	73ab	130
OMF + CF (50:50)		56	70ab	140
OMF + CF (25:75)		57	67ab	117
OMF + CF (75:25)		59	65b	113
		NS		NS
	2007			
Control		77a	83a	130a
100% OMF (12 t)		71ab	75b	125b
100 % CF (60 kg N, 19.6 kg P, 39.6 kg K)		57c	72b	125b
OMF + CF (50:50)		66bc	75b	125b
OMF + CF (25:75)		66bc	72b	120c
OMF + CF (75:25)		64bc	70b	120c

Means followed by the same letters in a column are not significantly different from each other at $P>0.05$

OMF – Organo-Mineral Fertilizer CF – Chemical Fertilizer

Vitamin C contents

Vitamin C contents of pepper fruits in 2006 ranged from 1.3 mg/100g to 7.20 mg/100g, plants which received OMF+CF (75:25), OMF + CF (25:75) and OMF + CF (50:50) had vitamin C contents which were significantly ($p<0.05$) higher than the control and CF treated plants. The highest vitamin C content (7.20 mg/100g) was observed in pepper fruits treated with OMF + CF (75:25), followed by this was OMF + CF (25:75) and the lowest (1.13 mg/100g) was from CF treated plants, this value was not significantly different from that of the control. A similar trend was observed in the year 2007, fertilizer application with the exception of 100% OMF significantly ($p<0.05$) increased vitamin C in pepper fruits compared to the control. Increase in vitamin C content followed this order of fertilizer application: OMF + CF (75:25) > OMF + CF (50:50) > OMF + CF (25:75) > 100 % CF > 100 % OMF > Control (Table 6). Organo-mineral fertilizer and chemical fertilizer were judiciously combined using the ratio of 75:25 since all the parameters evaluated excelled with this treatment. High and sustained crop yields can be obtained with judicious and balanced NPK fertilization combined with organic matter amendment (Kang and Balasubraman, 1990; Makinde *et al*., 2001). Makinde *et al*., (2010) reported that Pacesetter Grade B organic fertilizer (PGB) + NPK (75:25) was found to be optimum for *Amaranthus cruentus* (L.) production, higher crude protein content and ether extract.

Nitrogen, phosphorus and potassium concentrations in pepper fruit

Table 7 shows the effect of inorganic and organo-mineral fertilizers on nitrogen, phosphorus and potassium concentration in pepper fruit. In the year 2006, fertilizer application with the exception of OMF + CF (50:50) and OMF + CF (25:75) significantly ($p < 0.05$) increased the concentration of nitrogen in pepper fruits above the control. The highest value (22.5 g/kg) was from the fruits of plants treated with OMF + CF (75:25), this was followed by the fruits of plants with the application 100 % CF and 100 % OMF (20.8 and 20.4 g/kg respectively). Application of OMF + CF (50:50) in 2006 significantly ($p < 0.05$) increased potassium concentration in pepper fruit when compared with the control while fertilizer application showed no significant effect on phosphorus concentration. In 2007, nitrogen concentration in pepper fruit was significantly ($P<0.05$) enhanced by OMF + CF (25:75) application when compared with the control and 100% OMF while fertilizer application with the exception of CF and OMF + CF (50:50) significantly ($p < 0.05$) increased the potassium concentration in pepper fruit. The highest value (31.7 mg/kg) was observed on plants treated with 100 % OMF followed by this were plants with the application of OMF + CF (25:75) (26.7 mg/kg) and the lowest (13.7 mg/kg) was from unfertilized plants (control). All fertilizer treated plants had significantly ($p < 0.05$) higher phosphorus concentrations in their fruits when compared with the control, highest value (3.5 mg/100g) resulted from OMF+CF (75:25), followed by this is 100% OMF (3.4 mg/100g) and 100% CF (2.4 mg/100g). Highest nutrient values were obtained in fruits where both organo-mineral and chemical fertilizers were applied, a similar observation was reported by Mahmud et al., 2009 that application of organic and inorganic fertilizers in combination increased the quality of plants. This was due to the complementary effect of the fertilizers. . Adequate nutrients were supplied by the fertilizer combination and nutrient loss in form of

leaching was prevented by the organic portion of the fertilizer, thus, plants took up enough nutrients which were transported to the fruits. Nitrogen, phosphorus and organic carbon contents of soil were not significantly affected by fertilizer application in both years, this may be due to the low contents of the above in both the soil and OMF used. Application of 100% OMF, OMF+CF (50:50) and OMF+CF (25:75) significantly ($P<0.05$) increased phosphorus content (10.8, 9.7. 10.5 mg/kg respectively) above the control in 2006 while only 100% OMF significantly ($P<0.05$) increased P above the control in 2007. Post-planting soil pH was increased to 7.4 by 100% OMF application, this value was significantly ($P<0.05$) higher than the value obtained for control and other fertilizer treatments except OMF+CF (75:25) (Table 8).

Table 6: Influence of inorganic and organo-mineral fertilizers applied at varying levels on the vitamin C content of pepper on the field

Treatment/ha	Year	Vitamin c content (mg/100g)
	2006	
Control		1.30c
100% OMF (12 t)		1.90bc
100 % NPK (60 kg N, 19.6 kg P, 39.6 kg K)		1.13c
OMF + CF (50:50)		3.1b
OMF + CF (25:75)		3.40b
OMF + CF (75:25)		7.20a
	2007	
Control		0.29c
100% OMF (12 t)		0.92bc
100 % CF (60 kg N, 19.6 kg P, 39.6 kg K)		1.20b
OMF + CF (50:50)		1.28b
OMF + CF (25:75)		1.26b
OMF + CF (75:25)		2.60a

Means followed by the same letters in a column are not significantly different from each other at $P>0.05$

OMF – Organo-Mineral Fertilizer CF – Chemical Fertilizer

Table 7: **Effects of Inorganic and Organo-Mineral Fertilizers applied at varying levels on N, P and K concentrations in pepper fruit on the field**

Treatment/ha	Year	N g/kg	P mg/kg	K mg/kg
	2006			
Control		16.7c	1.6	49.3b
100% OMF (12 t)		20.4ab	2.2	55.7ab
100 % CF (60 kg N, 19.6 kg P, 39.6 Kg K)		20.8ab	3.0	55.3ab
OMF + CF (50:50)		17.6bc	4.1	61.0a
OMF + CF (25:75)		19.4abc	2.7	55.7ab
OMF + CF (75:25)		22.5a	2.5	53.7ab
			NS	
	2007			
Control		28.6b	0.7d	13.7c
100% OMF (12 t)		28.9b	3.4a	31.7a
100 % CF (60 kg N, 19.6 kg P, 39.6 Kg K)		32.1ab	2.4b	21.7bc
OMF + CF (50:50)		33.5ab	3.0ab	17.3bc
OMF + CF (25:75)		38.0a	1.5c	26.7ab
OMF + CF (75:25)		32.0ab	3.5a	24.3ab

Means followed by the same letters in a column are not significantly different from each other at P>0.05

OMF – Organo-Mineral Fertilizer CF – Chemical Fertilizer

Table 8: Effects of different combinations of inorganic and Organo-mineral fertilizers on the chemical properties of post planting soil on the field

Treatments/ha	Year	Nitrogen g/kg	Phosphorus mg/kg	Potassium mg/kg	pH(H_20)	O.C. g/kg
	2006					
Control		0.7	3.7b	5.0	7.1bc	7.7
100% OMF (12 t)		1.7	10.8a	5.7	7.4a	9.1
100 % CF (60 kg N, 19.6 kg P, 39.6 Kg K)		1.9	6.1ab	5.0	7.0c	8.1
OMF + CF (50:50)		1.7	9.7a	5.7	7.2bc	8.1
OMF + CF (25:75)		2.9	10.5a	6.0	7.1bc	8.5
OMF + CF (75:25)		1.8	8.1ab	5.3	7.3ab	9.2
		NS		NS		NS
	2007					
Control		1.1	4.9b	1.9	7.1	8.1
100% OMF (12 t)		1.5	7.1a	2.3	7.2	8.2
100 % CF (60 kg N, 19.6 kg P, 39.6 Kg K)		1.5	6.2ab	2.0	7.0	8.4
OMF + CF (50:50)		1.5	5.9ab	1.7	7.0	8.5
OMF + CF (25:75)		1.1	5.3b	1.8	7.1	8.4
OMF + CF (75:25)		1.3	5.3b	2.4	7.1	8.3
		NS		NS	NS	NS

Means followed by the same letters in a column are not significantly different from each other at P>0.05

OMF – Organo-Mineral Fertilizer CF – Chemical Fertilizer
NS – Not Significant

Organic based fertilizers also excelled in post-planting soil chemical properties, this is similar to the findings of Adeniyan (2008) who reported that organic fertilizer increased soil chemical properties under cassava production.

CONCLUSION

This study shows that Pacesetter organo-mineral fertilizer at 12 t/ha or in combination with inorganic fertilizer at 75:25, 25:75 and 50:50 enhanced pepper fruiting, ripening, promotes pepper yield and better pepper quality in terms of vitamin C content and improved soil quality. It is therefore recommended that pepper should be grown with OMF at 12 t/ha, OMF+CF (75:25), OMF+ CF (50:50) for improved yield, nutrient composition and soil quality.

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