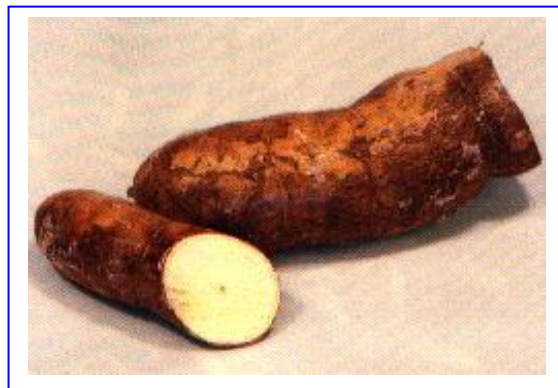


# **EVALUATION OF THE EFFECT OF APPLICATION OF ALGIFOL (FOLIAR FERTILISER) ON THE YIELD OF CASSAVA**

**BY**

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(A report of field testing of ALGIFOL sponsored by Ausley Nigeria Ltd)

## ABSTRACT

A trial was conducted on the National Root Crops Research Institute's farms at **Umudike** (05°29'N; 07°33'E) and **Igbariam** (06°15'N; 06°52'E) to test the effectiveness of ALGIFOL as foliar fertilizer for cassava production. ALGIFOL was applied to cassava crop alone and in combination with inorganic fertilizer and the yields of cassava (root and tops) were compared with those obtained with the application of various levels of inorganic fertilizer.

Application of recommended rate of inorganic fertilizer [450 NPK (20:10:10) kg/ha plus spraying of ALGIFOL at the rate of 1 x 1 litre gave the highest cassava root yield of 25.7 t/ha and 23.3 t/ha at **Umudike** and **Igbariam** respectively and the highest yield of cassava tops at **Umudike**. Application of ALGIFOL alone resulted to higher cassava root yield over the control. This increase in yield which ranged from 14% to 18% and from 17% to 27% at Umudike and Igbariam respectively, was though not significant at 5% level.

Repeated applications of ALGIFOL did not result to any yield advantage over ALGIFOL applied once during the cassava crop life cycle. Application of ALGIFOL was equivalent to the application of 225 kg NPK (20:10:10)/ha inorganic fertilizer at both locations studied.

Application of ALGIFOL improved the harvest Index of cassava.

## INTRODUCTION

One of the major constraints to crop production in south eastern Nigeria is declining soil fertility arising from reduced fallow period (Ano, 1998). In the past Nigerian farmers relied on shifting cultivation systems or bush fallow for maintaining the fertility of their arable lands. This system is sustainable as long as length of fallow is long enough (10 to 15 years) to ensure natural regeneration of soil nutrients. Today, interwoven socio-economic factors such as population pressure, urbanisation etc have limited Nigerian farmers' access to farm lands. As a result of this, fallow period has shortened tremendously and yields of root and tuber crops have declined in the Nigerian farming systems.

To improve yield of crops, Nigerian farmers are advised to apply fertilisers to their crops. Yield increases ranging from 50% to 300% have been obtained at the National Root Crops Research Institute by the application of inorganic fertilizer (NRCRI, 1989; 1990; 1991). Application of inorganic fertilisers improves the nutrient status of the soil thereby making sufficient nutrients to be available to the growing crop.

Certain fertilisers are applied on the foliage of a growing crop. Such foliar fertilisers improve crop yield by improving the photosynthetic efficiency of the leaves and also by enhancing the transfer of photosynthates from the leaves to the storage organs.

For the expected yield increases to be obtained on application of fertilisers to crops, appropriate rate and type of fertilizer have to be used. Indiscriminate application of fertilizer will not only lead to yield losses but will also result to environmental degradation. The objective of this work was to evaluate the effect of application of ALGIFOL (foliar fertilizer) on the yield of cassava (*Manihot esculenta* Crantz)

### Material and Methods

The trial was conducted on the National Root Crops Research Institute's farms at Umudike (05° 29'N; 07° 33' E) and Igbariam (06° 15'N; 06° 52'E). The soils of the experimental sites have the characteristics shown in table 1.

Table 1. Physico-chemical properties of soils of the experimental sites at Umudike and Igbariam.

Properties	Umudike	Igbariam
Texture	Sandy loam	Sandy clay loam
pH	5.2	5.5
Organic carbon (%)	2.51	2.30
Available P (ppm)	12.2	6.5
Exch. K c mol / kg	0.08	0.12
Exch. Ca c mol / kg	0.43	3.12
Exch. Mg c mol / kg	0.35	2.00
Exch. Na c mol / kg	0.06	0.08
Exch. Acidity c mol / kg	3.50	2.85
Exch. Effective CEC c mol / kg	4.42	8.17
Total Nitrogen (%)	0.06	0.16

Land preparation was by tractor. Cassava (*Manihot esculenta* Crantz var NR 8052) was planted in both locations in September on ridges at 10,000/ha. The treatments which are given in Table 2 consist of various rates of inorganic fertilizer, inorganic fertilizer plus ALGIFOL (foliar fertilizer), and ALGIFOL (foliar fertilizer) applied alone at different frequencies. ALGIFOL fertilizer was always diluted according to the manufacturers directive (1 litre ALGIFOL diluted in 1000 litres) with water before application. The plot size was 6 x 5m<sup>2</sup>. The design of the experiment was randomised complete block with three replications. Inorganic fertilizer application and the first spraying of ALGIFOL (foliar fertilizer) were done eight weeks after planting, thereafter ALGIFOL was applied to the appropriate plots every other month until the plot received the required number of applications as indicated in Table2 below.

The trial at both locations were weeded at the appropriate times. The crop was harvested at 12 months after planting. Fresh weights of cassava roots and tops were recorded at harvest.

Table 1. Rates of inorganic fertiliser, inorganic fertiliser plus ALGIFOL (foliar fertiliser), and ALGIFOL (foliar fertiliser) applied to the cassava crop.

No.	Quantity	TREATMENTS
1.	450kg + 1x1 litre	NPK (20:10:10) / ha ALGIFOL / ha
2.	450kg	NPK (20:10:10) / ha
3.	225kg	NPK (20:10:10) / ha
4.	112.5kg	NPK (20:10:10) / ha
5.	4 x 1 litre	ALGIFOL / ha
6.	3 x 1 litre	ALGIFOL / ha
7.	2 x 1 litre	ALGIFOL / ha
8.	Control	No application

1x1 litre ALGIFOL / ha means ALGIFOL (foliar fertiliser) applied once at the rate of 1 litre of ALGIFOL / ha.

2x1 litre ALGIFOL / ha means ALGIFOL (foliar fertiliser) applied twice at the rate of 1 litre of ALGIFOL / ha during the growth cycle of the cassava crop.

3x1 litre ALGIFOL / ha means ALGIFOL (foliar fertiliser) applied three times at the rate of 1 litre of ALGIFOL / ha during the growth cycle of the cassava crop.

4x1 litre ALGIFOL / ha means ALGIFOL (foliar fertiliser) applied four times at the rate of 1 litre of ALGIFOL / ha during the growth cycle of the cassava crop.

Note: 1 litre of ALGIFOL is normally diluted with water to 1000 litres. The solution is thereafter spread on 1 ha of cassava.

## RESULTS AND DISCUSSION

The effect of rate of application of inorganic fertilizer, inorganic fertilizer plus ALGIFOL and ALGIFOL alone on cassava root and tops yield at Umudike and Igbariam are shown in Tables 3 and 4 respectively. Application of recommended rate of inorganic fertilizer (450 NPK (20:10:10) kg/ha] plus spraying of ALGIFOL at the rate of 1 x 1 litre gave the highest cassava root yield of 25,7 t/ha and 23.3 t/ha at Umudike and Igbariam, respectively. This treatment also gave the highest yield of cassava tops at Umudike.

Application of ALGIFOL alone resulted to higher cassava root yield over the control. This increase in yield which ranged from 14% to 18% and from 17% to 27% at Umudike and Igbariam respectively, was though not significant at 5% level. The treatments had no effect on the yield of cassava tops at Igbariam.

Repeated applications of ALGIFOL did not result to any yield advantage over ALGIFOL applied once during the cassava crop life cycle. When the cassava root yield obtained using ALGIFOL was compared with those obtained by application of inorganic fertilizer, it was observed that application of ALGIFOL was equivalent to the application of 225 kg NPK (20:10:10)/ha inorganic fertiliser at both locations studied.

Application of ALGIFOL improved the harvest index of cassava (Table 3 and 4). Harvest index gives an insight into the partitioning of photosynthates between the sink or storage organ (roots) and the source (shoots) . A high value shows that most of the photosynthates are transported to the roots (i.e. high sink capacity). It therefore follows that ALGIFOL increases cassava root yield by not only improving the photosynthetic efficiency of the cassava leaves (since it is a foliar fertiliser) but also by enhancing the transfer of the photosynthates to the roots (the storage organ)

## CONCLUSION

Application of ALGIFOL to cassava crop leads to increase in yield of cassava.

Repeated application of ALGIFOL to cassava crop does not result to increased cassava root yield over one single application.

Maximum benefit of ALGIFOL is derived when applied once at the rate of 1 litre/ha to cassava crop that has received full dose of inorganic fertilizer (450 kg NPK 20:10:10).

Table 3. Effect of rate of application of inorganic fertiliser, inorganic fertiliser plus ALGIFOL and ALGIFOL alone on cassava root and tops yield at Umudike

Treatment	Cassava Yield (t/ha)		Harvest Index
	Root	Tops	
450kg NPK (20:10:10) / ha + 1x1 litre ALGIFOL / ha	25.7 a	7.0 a	0.79 ab
450kg NPK (20:10:10) / ha	21.8 b	5.4 bc	0.80 ab
225kg NPK (20:10:10) / ha	18.9 bc	5.2 bc	0.79 ab
112.5kg NPK (20:10:10) / ha	18.6 bc	5.4 bc	0.78 ab
4 x 1 litre ALGIFOL / ha	17.7 cd	3.8 d	0.82 a
2 x 1 litre ALGIFOL / ha	17.2 cd	6.2 ab	0.74 b
3 x 1 litre ALGIFOL / ha	17.1 cd	5.5 bc	0.76 b
1 x 1 litre ALGIFOL / ha	17.1 cd	5.3 bc	0.76 b
Control No application	15.0 d	4.9 cd	0.75 b

Means followed by a common letter in each column are not significantly different at 5% level.

Table 4. Effect of rate of application of inorganic fertiliser, inorganic fertiliser plus ALGIFOL and ALGIFOL alone on cassava root and tops yield at Igbariam

Treatment	Cassava Yield (t/ha)		Harvest Index
	Root	Tops	
450kg NPK (20:10:10) / ha + 1x1 litre ALGIFOL / ha	23.3 a	4.3 a	0.84 a
450kg NPK (20:10:10) / ha	18.6 b	4.2 a	0.82 ab
225kg NPK (20:10:10) / ha	17.2 b	4.0 a	0.81 ab
112.5kg NPK (20:10:10) / ha	15.7 bc	3.3 a	0.83 ab
4 x 1 litre ALGIFOL / ha	15.6 bc	3.6 a	0.81 ab
2 x 1 litre ALGIFOL / ha	15.1 cd	4.3 a	0.77 b
3 x 1 litre ALGIFOL / ha	15.5 bc	4.9 a	0.76 b
1 x 1 litre ALGIFOL / ha	16.4 b	3.8 a	0.81 ab
Control No application	12.9 c	4.3 a	0.75 b

Means followed by a common letter in each column are not significantly different at 5% level.

## REFERENCES

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