



ENVIROM HOLDING AFRICA LTD REPORT

**REPORT ON EFFECT OF ENVIROM CBX ON CABBAGES YIELD
WHEN COMPLEMENTING MINERAL FERTILIZER**

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ABSTRACT

A field experiment was conducted during the growing season A of the year 2018 to assess the efficacy of Envirom CBX (N9Ca0.1Mg0.01Fe0.05 B0.00774Znc0.05Mo6.0ppmCo300ppmHA0.3 FA25Urea6) when complementing compost and mineral fertilizer(N17P17K17) and Urea, on yield of cabbage(*Brassica oleracea* L. var. pruktor F1). The experimental design was Randomized complete bloc design with 7 treatments replicated thrice :

T0=zerofertilizer,T1=NPK(200kgs/ha)T2=Compost,T3=Compost+CBX(Soil),T4=Compost+CBX(Foli ar) ,T5=Compost+CBX(Soil)+CBX(VS)CBX(VS)+CBX(FL)+CBX(PF),T6=compost+NPK(140Kg/ha)+Urea(70kgs/ha)+CBX(Soil)+CBX(VS)CBX(VS)+CBX(FL)+CBX(PF). Application of CBX complimented to compost and mineral fertilizer exhibited significant influence on the yield of cabbage. The highest marketable head yield (181.333 t/ha) was obtained in T6 equivalent to 17% increase over relative controlT1.

Keywords: Cabbage, CBX, N17P7K17, Urea, compost, yield

INTRODUCTION

Cabbage (*Brassica oleracea* v. Pruktor F1.) is one of the most important, high nutritive and palatable leafy vegetables widely cultivated in Rwanda. It is a rich source of protein, minerals and vitamin A (Uddin et al., 2009). It has some medicinal value as it prevents constipation, increases appetite, speeds up digestion and is very useful for diabetic patient. Cabbage is well known to be an exhaustive crop and has the capacity to absorb higher amount of nutrient from soil. The average yield of cabbage is very low in Rwanda compared to other developed countries due to unbalanced application of fertilizers and no consideration of micronutrients. The supply of proper nutrient must be ensured during its cultivation, which is related to the judicious application of fertilizer. In the upland field, cabbage yields were high when chemical fertilizers were applied (Kamiyama et al., 1995). The crop production system with high yield targets cannot be sustainable unless nutrient inputs to soil are at least balanced against nutrient removal by crops (Jahiruddin and Rijpma, 2004). Fertilizer enhances plant growth by providing amendments to the soil via various macro and micronutrients. Optimum fertilization is required to produce top quality and high yields while a lack of essential fertilizers will stunt its growth, leading to undersized and poorly developed heads (M. N. A. Nahe et al, 2014). (Johnson et al., 2005) reported that among various methods of micronutrients application like soil, foliar and seed treatments, foliar sprays have been more effective in yield improvement and grain enrichment. The addition of organic fertilizers efficiently ensures high production and continuous crops by improving soil properties and increase roots development and soil microorganisms activity (Abou EL-Magd et al., 2006; Ayoola and Maknide, 2009). Some researchers reported that spraying with humic acid improve plant growth and yield (Akinci et al., 2009).

Some researchers investigated the effect of macro and micronutrients for cabbage production and recommended organic manure with macro and micronutrients to be added to the soil for increased head yield of cabbage (Farid et al., 1998). Boron is a very sensitive micronutrient and the range of deficiency and toxicity are narrow. However, in cole crops like cabbage, boron requirement is very high (Tisdale et

al., 1995). Ullah et al. (1999) reported the significant influence of combined application of N, P, K and S on the yield of cabbage.

The fact that fertilization solve the problem of low yield of cabbages, by supplementing many elements to a crop that may be limiting production at a time when nutrient uptake from the soil is inefficient or nonexistent, thus, research was conducted to assess the impact of application of organic liquid fertilizer CBX containing(N9Ca0.1Mg0.01Fe0.05 B0.00774Znc0.05Mo6.0ppmCo300ppmHA0.3 FA25Urea6) on growth and yield of cabbages in Rwanda, as contributing to the productivity, profitability, and sustainability of the cabbages production system.

METHOD AND MATERIALS

The investigation was carried out on cabbage (*Brassica oleracea* v. Pruktor F1) at Gako farm, Masaka Sector, Kicukiro District during growing season A2018. The soil of the experimental site was silty clay loam. The experiment was laid out in a Randomized Complete Block Design (RCBD) with three replications. Each block consisted of 7 unit plots. The size of each unit plot was 2 m × 2 m. Spacing was 40cm×40cm. The gap between the plots was 50 cm and between the blocks was 70 cm. A total of 7 treatments including the untreated control were selected in this investigation which were:

T0=zerofertilizer,T1=NPK(200kgs/ha)T2=Compost,T3=Compost+CBX(Soil),T4=Compost+CBX(Foliar) ,T5=Compost+CBX(Soil)+CBX(VS)CBX(VS)+CBX(FL)+CBX(PF),T6=compost+NPK(140Kg/ha)+Urea(70kgs/ha)+CBX(Soil)+CBX(VS)CBX(VS)+CBX(FL)+CBX(PF). CBXsoil applied was made once 3 days before transplanting on recommended treatments, i.e 10L/ha while CBXfoliar applied was made four times, respectively twice at leafy stage and twice at heading formation stage i.e 1.25Lha*4=5L/ha. The dilution for CBXfoliar applied was 5ml in 1L of water while CBXsoil applied was 1liter in 20l of water. The application of liquid CBXfoliar was always used in late evening and shaken well before use

RESULTS AND DISCUSSION

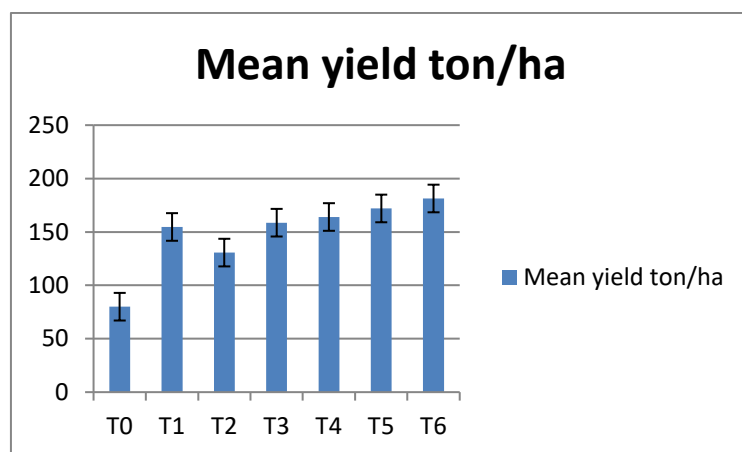
Different fertilizer managements created a significant impact on the yield of cabbage (Table 1 and figure 2). Wide variation was noted between T0 and T6 in cabbage yield (80 to 181.333 t/ha). The head yield directly depends on head weight of cabbage. The highest yield (181.333t/ha) as well as 17% increase over relative control(T1) was obtained from the treatment T6 which contained CBX[(N9Ca0.1Mg0.01Fe0.05Znc0.05Mo6.0ppmCo300ppmHA0.3FA25Urea6)+NPK(140kgs/ha)]. The following treatment was T5 (172Kgs/ha) with 11% yield increase compared to T1. There were no significant differences in yields among the treatments T2, T3 and T4. The lowest yield was recorded in the control plots (T0) .

The results revealed that all the fertilizers contributed on the yield of cabbage while the effect of CBX was more prominent than other nutrients. seems that S. It was observed that NPK and Urea alone could increase yields (80ton/ha to 154.667ton/ha), while CBX(N P K Ca Fe Mn Co Zn Cu ,B,Mo HA&FA) complimenting NPK,Urea and compost increase yield (80 to 181.333ton/ha) .

Table 1 shows the effect of Envirom CBX on cabbages yield

Treatment	R1	R2	R3	Average cabbage weight	Mean yield kg/Plot	Mean yield ton/ha	Treatment absolute control	Treatment relative control
T0	1.5	2.5	2	2	32	80	1	0.517241
T1	4	3.5	4.1	3.866667	61.86667	154.6667	1.933333	1
T2	3.8	3	3	3.266667	52.26667	130.6667	1.633333	0.844828
T3	3.8	4	4.1	3.966667	63.46667	158.6667	1.983333	1.025862
T4	4.1	4	4.2	4.1	65.6	164	2.05	1.060345
T5	4.2	4.3	4.4	4.3	68.8	172	2.15	1.112069
T6	4.5	4.8	4.3	4.533333	72.53333	181.3333	2.266667	1.172414

Figure 1 shows the effect of Envirom CBX on cabbage yield



These results agree with the observation of Sarma et al. (2002) recorded the highest yield of cabbage (cv. Green express) with the application of 0.5% borax. The beneficial effects of foliar urea applications, expressed as an increase in yield and an improvement of crop quality were reported in many vegetable species such as cabbage, onion, cucumber, squash (Padem and Yildirim 1996, Kolota and Osinska 2001). Furthermore, Kolota and Osinska (2001) concluded that a multi-component foliar fertilizer containing.

Increase in yield of 181.333ton/ha may be due to cbx ((N9Ca0.1Mg0.01Fe0.05 B0.00774Znc0.05Mo6.0ppmCo300ppmHA0.3FA25Urea6) combined with NPK(14OKgs/ha).The application of humic substances increased the yield in soybeans, potatoes, and algae cultures. It also plays an important role in increasing the fruit yield, also the quality of squash plants are increased by humic substances application. 100% increase in the yield of potatoes and cabbage can be achieved by combined application of NPK fertilizers and humic (Syabryai et al.,).Humic acid also has direct cytokinin (Zhang and Ervin, 2004) and auxin or gibberellin-like stimulatory effects (Pizzeghello et al., 2001), along with indirect effect on plant metabolism (Piccolo et al., 1991).

CONCLUSION AND RECOMANDATION

Based on the findings of the experiment, efficient production of cabbage, it is judicial to use different macro and micronutrients with CBX (N9Ca0.1Mg0.01Fe0.05

B0.00774Znc0.05Mo6.0ppmCo300ppmHA0.3 FA25Urea6) fertilizer with recommended dose.

Application of micronutrients is one of the important management practices to improve soil productivity. Yield and profit are important to a farmer. Higher yield may also be achieved using higher plant population. Soil health is also very important for sustainable production

Furthermore, the present result on cabbage concludes that T6 significantly with 17% yield increase.

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