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Short Communication

EFFECT OF COMMERCIAL BLEACH ON PERFORMANCE OF PEPPER (*Capsicum annum L.*)

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ABSTRACT
The effect of different concentrations of JIK bleach (0.0, 0.1, 1.0 and 10%) on growth and growth components of pepper (*Capsicum annum L.)* was studied in the screen house. The effect on seedling damping-off, plant height, plant leaf area, fresh weight of fruits and number of flowers per plant and fresh weight of plants were monitored at 3months after planting. The plant height increased from 0% to 1.0% and reduced at 10% with the optimum growth at 0.1%. Apart from the increase in total fruit weight, mean number of flowers and fresh weights of plants at 10% concentration which recorded an increase compared to the control treatment, the trend was similar to that of plant height with significant differences among the concentrations tested. This work also indicated an absence of damping-off of pepper seedlings when 0.1, 1.0 and 10% concentrations of JIK bleach were used. The research shows promise for use by resource – poor farmers in Africa because the chemical is cheap, readily available, accessible and environment-friendly.

KEYWORDS: JIK Bleach (a.i. NaOCl), Pepper (*Capsicum annum L.*) performance.

INTRODUCTION

Pepper (*Capsicum* spp.) is one of the dietary vegetable products, with cheap source of protein, energy, vitamins and minerals for the rising human population associated with rapid urbanization and industrial growth in Nigeria. (Ologunde, *et al*., 1992; Gubben and Denton, 2004; Ayodele and Aruleba, 2007).

Pepper is an important soup and stew condiment in Nigeria and other Sub-Saharan Africa. Apart from production threat imposed by diseases particularly damping-off of seedlings caused by *Sclerotum rolfsii* (Onuegbu and Oji-Isoma; 2002), threats as a result of nutrient losses due to run-offs especially in Typic paleudult of the South-South Nigeria are pervasive. In these areas, farmers are educationally poor and very poor in resources generally. Even when soil amendment materials are available, they are expensive and hardly accessible to them in the localities. This work reports the effect of readily available, cheap and environment-friendly, chemical, commercial bleach, on performance of pepper in a Typic paleudult, Rivers State, Nigeria.

MATERIALS AND METHODS

JIK bleach (a.i. 5% Sodium hypochlorite, perfumed) produced by Reckitt and Colman (Nigeria) Limited was used in this study. Seeds of pepper (*Capsicum annum*) cultivar Tatashe were procured at National Horticultural Research Institute (NIHORT), Mbato, Okigwe. In assessing the effect of the commercial bleach on the seedlings twenty aluminum basins (30cm in diameter and 10.5cm deep) were filled with garden loam soil (pH 4.5) which had been sieved to remove large pieces of plant debris. Each basin was then moistened with 200ml sterile distilled water twice weekly. Five seeds were sown per basin and later thinned to two seedlings. The 20 basins were divided into 4 sets of 5 basins each and each set moistened with either 200ml distilled water (control) or 10%, 1.0% and 0.1% JIK bleach (5% NaOCl) concentrations respectively after a 2-day interval. They were transferred to the Plant house at the Department of Forestry/Environment, Rivers State University of Science and Technology, Port Harcourt (mean temperature of 28 ± 1^0C and 78% RH) in a completely randomized design (CRD). The plants were monitored for damping-off diseases, height, leaf area, mean number of flowers per plant and fresh weight of fruits per plant at 3months after planting. A seedling was regarded as infected when it showed clear evidence of "damping-off" that is falling over after attack by pathogen. Plant height was measured by means of a meter rule while leaf area was measured by the Graph Method. The number of flowers at 50% flowering was estimated by counting while fruit number was counted at the onset of ripening. The differences observed were statistically tested by the Duncan Multiple Range Test (DMRT) at 5% level of probability.

RESULTS AND DISCUSSION

The effect of JIK bleach (a.i. NaOCl) on performance of pepper (*Capsicum annum L.*) is shown in Table 1. For all plant characters assessed there were significant differences between the control (distilled water) and variable JIK bleach concentrations (0.1, 1.0 and 10.0%). Plant height increased from 0% to 1.0 and decreased at 10% bleach concentration. Similarly, this observation followed the

same trend except that all other parameters assessed differed significantly between 0% and other concentrations of bleach. However, there was no significant difference between the plant height, plant leaf area at 0% and 10% concentrations. Similarly, Wahua and Tariah (1984) reported the inhibition of the growth of radicles and hypocotyls of lima beans at 20, and 30% bleach and the promotion of their growth at 10% concentration. Even though Onuegbu and Oji-Isoma (2002) observed an inhibitory effect of JIK bleach on growth of pepper the present findings indicate that there was a reduction in the promotory effect of the bleach at 10% while promotion of plant characters was optimum at 0.1% concentration. Similarly, Zuofa and Onuegbu (1998) reported an increase in the performance of tomato when treated with sodium hypochlorite. However, Bartz and Lill, (1988), Goodin (1997) and Segall and Dow (1976) reported on the post harvest soft rot decay organisms of tomato fruits with chlorinated water. Similarly Lill and Laundon (1984), Ewart and Chrimes (1980) and Hendrix (1991) reported that chlorine has proven to be effective in the control of apple fruits while Wong and Preece (1985) observed that sodium hypochlorite reduced the growth of *pseudomonas tolaasii* in cultivated mushroom (*Agaricus bisporus*). The damping-off diseases of the pepper seedlings showed a significant difference between the control and other treatments in which the seedlings treated with 0.1, 1.0 and 10% bleach concentrations showed no damped-off seedlings. Onuegbu and Oji-Isoma (2002) reported no damped-off seedlings when treated with 0.1, 1.0 and 10.0% bleach concentration and further averred that bleach was used as a routine laboratory sterilant (Buescher, 1983). The present work agrees with their findings. However, plants treated with 1.0 and 10.0% bleach had scorched leaves. On the other hand, plants treated with 0.0 and 0.1% bleach were relatively healthy. This shows that at low concentration, JIK bleach could promote growth and boost pepper fruiting and flowering.

TABLE 1: Effect of JIK Commercial bleach on performance of pepper (*Capsicum annum L.*) (Means ± 95% C.L of 10 replicates)

Parameter/Plant Characters	Doses of Bleach (a.i. NaOCl) (%)			
	0.0	0.1	1.0	10.0
Plant height (cm)	3.5 ± 0.1^{b}	4.1 ± 0.1^{a}	3.6 ± 0.2^{b}	3.4 ± 0.9^{c}
Leaf area (cm^2)	1.3 ± 0.2^{b}	2.0 ± 0.1^{a}	1.4 ± 0.2^{b}	1.3 ± 0.2^{b}
Total fresh weight of fruits (kg)	1.5 ± 0.3^{c}	2.1 ± 0.02^{a}	1.8 ± 0.1^{a}	1.7 ± 0.1^{b}
Mean number of flowers/plant	5.3 ± 0.2^{c}	9.5 ± 0.2^{a}	7.2 ± 0.1^{b}	6.4 ± 0.2^{b}
Damped-off seedlings (%)	9.0 ± 0.2^{a}	0.0 ± 0.0^{b}	0.0 ± 0.0^{b}	0.0 ± 0.0^{b}
Fresh weight of plants (g)	16.4 ± 0.3^{c}	25.0 ± 0.2^{a}	23.0 ± 0.3^{a}	18.5 ± 0.4^{b}

By DMRT Figures in each horizontal row bearing similar letters are not significantly different at 5% level.

CONCLUSION

This research indicate that at 0.1% JIK bleach concentration, growth and growth components of pepper were boosted as well as improved the seedling health and pepper fruit production. This concentration of JIK bleach is recommended to resource-poor farmers in rural areas because of its efficacy in promoting growth and growth components of pepper as well as improving its health. The use of JIK bleach is advantageous because it is readily available, accessible to the farmers, inexpensive and environment-friendly. This information is particularly important to small scale farmers in Africa and developing countries in general.

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