

Effect of PROMOT[®] on Greenhouse Growing Cucumber

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A Trichoderma containing product, PROMOT, has been studied to have growth promoting effects on several growing crops including tomatoes, corn, and beans. PROMOT contains 2.0×10^8 conidia/gram *Trichoderma harzianum* and 3.0×10^8 conidia/gram of *Trichoderma koningii*.

The purpose of this experiment is to study the effect of PROMOT on cucumber growth.

Materials and Methods

A greenhouse study was conducted in Ventura County, California in 1995. Cucumber seeds were sown in silica sand and germinated on May 19, 1995. On June 7, 1995, the seedlings were transplanted to 30 cm pots filled with 6 kilograms of air dried soil obtained from a vegetable field. Each pot contained 2 cucumber plants. Twelve pots were selected for this experiment. The pots were divided into 3 groups with 4 pots each. Each group received one of the following three treatments.

Treatment	Description
Control	No PROMOT application (water only)
PROMOT 100	PROMOT diluted with 100 times water
PROMOT 500	PROMOT diluted with 500 times water

A randomized complete block design was employed with 3 treatments and 4 replications. The treatments were applied as a drench 3 times during the experimental period on June 13, June 20, and June 27, 1995. Control treatment received 500 cc of water in each application. The PROMOT treatments received 500 cc of properly diluted PROMOT solution in each application. The solution was applied onto each pot. One hour after the treatment application, each pot was watered by 1000 cc of water.

ON August 2, 1995, plant height of each plant was measured from the soil level. After the plant height measurement, plants were cut at the soil level for fresh weight. Plants were then washed with distilled water and dried in an oven at 75°C for 24 hours for dry matter yields.

Results and Discussion

Plant heights of cucumber plants for each treatment are shown in Table 1. Treatment with PROMOT diluted with 500 times of water significantly increased

the height of cucumber plants. There was no difference in the plant height between control and treatment of PROMOT diluted with 100 times of water.

Table 1. Effect of PROMOT on the height of cucumber plants.

Treatment	Plant Height (cm)				
	1	2	3	4	Average *
Control	119	74	152	101	112 ab
PROMOT100	120	80	121	66	97 b
PROMOT 500	137	113	148	104	126 a

* Means in a column not followed by the same letter differ significantly ($P \leq 0.05$) as determined by DRMT.

The fresh weight per plant for each treatment is shown in Table 2. Even though the treatment with PROMOT diluted with 500 times of water increased the fresh weight of cucumber plants, the increase was not statistically significant at $P \leq 0.05$.

Table 2. Effect of PROMOT on the fresh weight of cucumber plants.

Treatment	Fresh Weight (gram/plant)				
	1	2	3	4	Average *
Control	90.6	120.1	54.6	85.3	87.7 a
PROMOT100	86.3	93.0	67.8	56.6	75.9 a
PROMOT 500	96.0	124.5	104.0	85.1	102.4 a

* Means in a column not followed by the same letter differ significantly ($P \leq 0.05$) as determined by DRMT.

Table 3 shows the dry weight of cucumber plants for each treatment. Treatment with PROMOT diluted with 500 times of water significantly ($P \leq 0.05$) increased the dry weight of cucumber plants as compared to the control and treatment with PROMOT diluted with 100 times of water.

Treatment of PROMOT diluted with 500 times of water significantly ($P \leq 0.05$) increased height and dry weight of cucumber plants. However, at a higher concentration (diluted with 100 times of water) of PROMOT, it did not affect the growth of cucumber plants. Windham et al. (1986) reported that *Trichoderma* spp. produced growth-regulating factors which enhanced seed germination and plant growth. With the results obtained in this experiment, it appears that the growth promoting effect of the growth regulating factors produced by *Trichoderma* spp. may be effective only at low concentrations. At a higher

concentration (dilution with 100 times of water) the growth regulating factors may not be effective on promoting plant growth. Future experiments with high concentration of PROMOT shall be conducted to confirm this finding.

Table 2. Effect of PROMOT on the dry weight of cucumber plants.

Treatment	Dry Weight (gram/plant)				
	1	2	3	4	Average *
Control	10.1	13.6	8.5	13.1	11.3 b
PROMOT100	8.7	14.0	9.8	13.7	11.6 b
PROMOT 500	13.7	15.5	13.9	16.7	15.0 a

* Means in a column not followed by the same letter differ significantly ($P \leq 0.05$) as determined by DRMT.

Table 4. Analysis of Variance for plant heights.

Source of Variation	df	SS	MS	F
Block	2	1653.50	826.75	5.55*
Treatment	3	5930.25	1976.75	13.26*
Error	6	894.50	149.08	
Total	11	8478.25		

Table 5. Analysis of Variance for fresh weights of Cucumber plants.

Source of Variation	df	SS	MS	F
Block	2	1407.93	703.97	3.93 ns
Treatment	3	2754.18	918.06	5.13 *
Error	6	1074.58	179.10	
Total	11	5236.69		

Table 6. Analysis of Variance for dry weights of Cucumber plants.

Source of Variation	df	SS	MS	F
Block	2	33.00	16.50	17.56 *
Treatment	3	40.01	13.34	14.19 *
Error	6	5.64	0.94	
Total	11	78.65		

Reference

Windham, M.T., Y. Elad, and R. Baker 1986. A mechanism for increased plant growth induced by *Trichoderma* spp. *Phytopathology* 76:518-521.