

GROWTH OF AROMATIC COLEUS (*COLEUS AMBOINICUS LOUR.*) AS AFFECTED BY BIOSTIMULATORS

J. Pablo Morales-Payan¹

ABSTRACT

In the Caribbean, aromatic coleus is used as a medicinal and seasoning plant. Anecdotic information indicates aromatic coleus responds to exogenous biostimulators, but little has been researched and published on the subject. Experiments were conducted to determine the effect of the biostimulators acetylthioprolin (AP, 250 mg/L), gibberellic acid (GA 50 mg/L), triterpenic acid (TTA, 400 mg/L), a commercial glycine-rich complex of amino acid and peptides (ACP, 1500 mg/L), aminolevulinic acid (ALA, 30 mg/L), and two commercial *Ascophyllum nodosum* extracts with cytokinin-like activity (CST and CTR, 30 mg/L). Aqueous solutions of the biostimulators were sprayed on the leaves aromatic coleus when plants reached 20 cm height and again 21 d later. Crop fresh and dry weights were determined 60 d after the second biostimulator application. Crop fresh and dry weights were positively correlated, increasing approximately 18% with TTA, CST and CTR, 15% with ACP and ALA, and 12% with GA. No yield increase was detected with the AP treatment.

INTRODUCTION

Aromatic coleus is used widely as a medicinal and seasoning plant in the Caribbean and other regions (Acosta et al., 1998; SADR, 1996). General guidelines for aromatic coleus production have been published, dealing mostly with planting material, fertilization, and harvest timing (Acosta et al., 1998), but little is known regarding the effect of exogenous physiology regulators on the growth and yield of this crop. Nevertheless, there is anecdotic information that aromatic coleus yield is responsive to the application of several growth stimulators such as gibberellic acid 3 (GA3), seaweed (*Ascophyllum nodosum*) extracts (SWE), and acetylthioprolin (AP). Those growth stimulators have been found to increase yield in other crops grown for their shoots, such as broadleaf cilantro (*Eryngium foetidum*) (Morales-Payan & Stall, 2005), tea (*Camelia sinensis*) (Kulasegaram & Kathiravetpillai, 1982) and mustard (*Brassica juncea*) (Khan et al, 1998). The objective of this research was to determine the effect of foliar application of AP, GA3, two SWE, a commercial glycine-rich complex of amino acid and peptides (ACP), and a triterpenic acid-rich extract of Siberian fir (*Abies sibirica*).

MATERIALS AND METHODS

Container experiments were conducted in Gainesville, Florida, in 2005. Aromatic coleus was grown from 15 cm-long cuttings planted in plastic containers (30 cm in diameter and 30 cm tall) filled with a commercial peat moss, vermiculite and perlite substrate.

The biostimulators tested were acetylthioprolin (AP, 250 mg/L), gibberellic acid (GA 50 mg/L), triterpenic acid (TTA, 400 mg/L), a commercial glycine-rich complex of amino acid and peptides (ACP, 1500 mg/L), aminolevulinic acid (ALA, 30 mg/L), and two commercial

¹ Department of Horticulture, University of Puerto Rico-Mayagüez. PO Box 9030, Mayagüez, Puerto Rico 00681.

Ascophyllum nodosum extracts with cytokinin-like activity (CST and CTR, 30 mg/L). Aqueous solutions of the biostimulators were sprayed on the leaves of aromatic coleus when plants reached 20 cm height and again 21 d later.

The plants were watered as needed and fertilized with N-P-K at a rate of 30 kg/ha. Aromatic coleus shoots were harvested 60 d after the second biostimulant spray.

Shoot fresh weight was determined right after harvest. Shoot dry weight was determined by drying the shoots on an oven at 90 C for 48 h. Results were submitted to analyses of variance and regression.

RESULTS AND DISCUSSION

For all the treatments, crop fresh and dry weights were positively correlated, and thus will be discussed as crop yield. AP did not increase crop yield. However, crop yield increased approximately 18% when TTA, CST, and CTR were applied. Application of ACP and ALA resulted in approximately 15% crop yield increase as compared to untreated aromatic coleus. GA sprayings resulted in approximately 12% crop yield increase (Figure 1).

Yield enhancement by GA resulted primarily from increased stem dry weight, as internodes were longer than in untreated plants. GA did not affect leaf number or leaf dry weight (data not shown). Yield improvement by ALA, ACP, CST, CTR, and TTA were due to overall shoot dry weight increase, attributable to the growth stimulation properties of those substances reported elsewhere (Khan, 1998; Rentsch et al., 1998; Wang et al., 2004; Zhang, 1997). Under the conditions of this study, TTA, CST and CTR applications provided the best results in enhancing aromatic coleus yield.

REFERENCES

- Acosta L., R. Menéndez, V. Fuentes, C. Rodríguez I. Hechevarria & C. Carballo. 1998. Instructivo técnico del cultivo de *Plecthranthus amboinicus* (Lour.) Spreng (orégano francés). Revista Cubana de Plantas Medicinales 3:51- 53.
- Khan, N. A., H. R. Ansari, & Samiullah. 1998. Effect of gibberellic acid spray during ontogeny of mustard on growth, nutrient uptake and yield characteristics. Journal of Agronomy and Crop Science 181(1):61-63 .
- Kulasegaram, S. & A. Kathiravetpillai. 1982. Effect of sprays of the biostimulant Ergostim on growth, recovery from pruning and yield of tea (*Camellia sinensis* L.). Tea Quarterly 51(3): 127-134.
- Morales-Payan, J. P. & W. Stall. 2005. Broadleaf cilantro (*Eryngium foetidum*) growth as affected by selected organic biostimulants. HortScience 40:1062.
- Rentsch D., K. Boorer, & W. B. Frommer. 1998. Molecular biology of sucrose, amino acid and oligopeptide transporters at the plasma membrane of plant cells. J. Membrane Biol. 162:177-190.

(SADR) Secretariat of Agriculture of the Dominican Republic. 1996. Report to the 1996 FAO International Conference for Plant Genetic Resources. Leipzig, Germany.

Wang, L. J., W. B. Jiang & B. J. Huang: 2004. Promotion of 5-aminolevulinic acid on photosynthesis of melon (*Cucumis melo*) seedlings under low light and chilling stress conditions. *Physiologia Plantarum* 121-258.

Zhang, X. 1997. Influence of Plant Growth Regulators on Turfgrass Growth, Antioxidant Status, and Drought Tolerance. *Crop and Soil Environmental Sciences*. Ph.D. Dissertation. Virginia Tech.

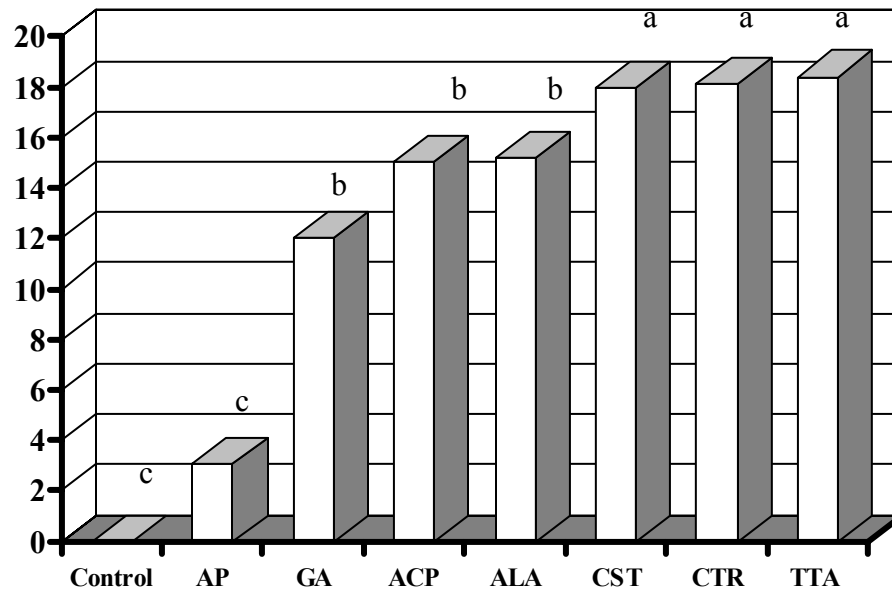


Figure 1. Effect of foliar applications of acetylthioprolin (AP), gibberellic acid 3, a commercial mixture of amino acids and peptides rich in glycine (ACP), aminolevulinic acid (ALA), two commercial extracts of *Ascophyllum nodosum* (CST and CTR), and triterpenic acid (TTA) on aromatic coleus shoot yield 60 days after treatment