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Effect of biostimulants on economics of flower and seed production in china aster cv. Kamini

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Abstract
The present experiment was conducted at the Department of Horticulture, College of Agriculture, Shivamogga (under University of Agricultural and Horticultural Sciences, Shivamogga) during 2016-17 to determine the effect of biostimulants on yield and economics of China aster cv. Kamini. The experiment comprised of thirteen treatments *viz*., two concentrations of biostimulants at four frequencies (first, second, third and fourth spray at 45, 60, 75, 90 days after transplanting) and control. Each treatment was replicated thrice in randomized complete block design (RCBD). The maximum flower yield/ha (30.23t) and seed yield/ha (4.57q) was obtained from the plants treated with GA_3 @ 200ppm. The study on the economics revealed that, GA_3 @ 200ppm recorded the highest B: C ratio of 6.1 and 12.08 for flower and seed production, respectively.

Keywords: biostimulants, aster, azospirillum, economics.

Introduction
India is bestowed with diverse geographical location, having varied types of climate besides scientific expertise, skilled and unskilled manpower. Hence, there is greater potential for the production of flowers on commercial scale. China aster (*Callistephus chinensis* Nees.L.) an annual flower crop belongs to the family Asteraceae used commercially as loose flowers, cut flowers and also grown in garden as herbaceous borders and formal beds. The lucrative and flourishing business of flowers has led to uncontrolled and indiscriminate use of chemical fertilizers, insecticides and fungicides. In this context, sustainable crop production using biostimulants is an important step towards successful horticulture which in turn will ensure profitable crop production in a cost effective and eco-friendly manner. Biostimulants are the materials other than the fertilizers that promote the plant growth when applied in minute quantities and are also referred as 'metabolic enhancers'. They promote the plant growth besides improving yield and quality. Since there is scanty information on the use of biostimulants on China aster crop, need was felt to study the effect of biostimulants.

Material and Methods
Studies were carried out at the Department of Horticulture, College of Agriculture, Shivamogga, Karnataka, during 2016 - 2017. The soil was prepared to fine tilth and raised beds of 2.5m X 2.5m were prepared under open field condition. 45 days old seedlings of China aster cv. Kamini (deep pink) were planted at a spacing of 30 cm X 30 cm. The experiment was laid out in Randomized complete block design (RCBD) with thirteen treatments and three replications. Treatments included T_1 – GA_3 @ 100ppm, T_2 – GA_3 @ 200ppm, T_3 – NAA @ 100ppm, T_4 – NAA @ 150ppm, T_5 – Boron @ 0.2%, T_6 – Boron @ 0.3%, T_7 – Biovita @ 0.5%, T_8 – Biovita @ 1%, T_9 – Humicil @ 0.5%, T_{10} – Humicil @ 1%, T_{11} – Azospirillum @ 4%, T_{12} – Azospirillum @ 8%, T_{13} – control. These biostimulants were sprayed at 4 intervals *i.e.*, @ 45, 60, 75 and 90 days after transplanting (DAT). Following observations were recorded at 105 DAT and were statistically analyzed.

Results and Discussion
The data regarding the economics of flower production of China aster cv. Kamini is presented in Table 1. Depending upon the treatments, the total cost of cultivation of China aster ranged between ₹ 1, 53,920.00 (control) to ₹ 1, 69,920.00 (Azospirillum @ 8 per cent) per ha.

Maximum flower yield (30.23 t/ha) recorded in GA_3 200ppm. However, control registered minimum flower yield (11.31 t/ha). The gross income per hectare was the highest in treatment GA_3 @ 200ppm amounting ₹ 12, 09,200.00/ha and the lowest was in control amounting ₹ 6, 18,000.00/ha. Similarly the same treatment GA_3 200ppm recorded the highest net income (₹ 10, 40,580.00/ha) per hectare. Thus, the maximum benefit: cost ratio was derived from treatment GA_3 @ 200ppm (6.1). However, the least value was found with control (1.9).

The data pertaining to the economics of seed production of China aster is presented in Table 2. The total cost of cultivation of China aster seed production ranged between ₹ 1, 59,920.00/ha (control) to ₹ 1, 74,620.00/ha (Azospirillum @ 8 per cent) per ha depending upon the treatments. The maximum seed yield (4.57 q/ha) was recorded in GA_3 @ 200ppm. While, minimum seed yield was recorded in control (2.66 q/ha). The gross income per hectare was maximum in treatment GA_3 @ 200ppm amounting ₹ 22, 85,000/ha and minimum in control amounting ₹ 13, 30,000.00/ha. Similarly the same treatment GA_3 200ppm recorded highest net income (₹ 21, 10,380.00/ha) per ha. Thus, the maximum benefit: cost ratio was derived from treatment GA_3 @ 200ppm (12.08). However, the least value was found with control (7.31).

In China aster the final income is decided based on the out turn of quality flowers and seeds. The plants treated with GA_3 @ 200 ppm which produced good quality and quantity of flowers resulted in maximum benefit: cost ratio. The results are supported by Dorajeerao *et al.*, 2012 [2] in garland Chrysanthemum, Chaitra and Patil (2007) [1] in China aster, Harshavardhan *et al.*, 2012 [4] in carnation, Harish *et al.*, 2012 in Gladiolus.

Table 1: Effect of biostimulants on economics of flower production in China aster cv. Kamini

Treatment No.	Treatments	Total cost of cultivation (Rs./ha)	Flower yield (t/ha)	Gross returns (Rs./ha)	Net returns (Rs./ha)	Benefit cost ratio
T_1	GA_3 @ 100ppm	1,61,270	26.63	10,65,200	9,03,930	5.6
T_2	GA_3 @ 200ppm	1,68,620	30.23	12,09,200	10,40,580	6.1
T_3	NAA @ 100ppm	1,65,620	15.72	6,28,800	4,63,180	2.8
T_4	NAA @ 150ppm	1,61,720	15.83	6,33,200	4,71,480	2.9
T_5	Boron @ 0.2%	1,54,220	16.80	6,72,000	5,17,780	3.4
T_6	Boron @ 0.3%	1,54,370	17.44	6,97,600	5,43,230	3.5
T_7	Biovita @ 0.5%	1,56,720	16.97	6,78,800	5,22,080	3.3
T_8	Biovita @ 1%	1,59,520	23.15	9,26,000	7,66,480	4.8
T_9	Humicil @ 0.5%	1,56,670	16.63	6,65,200	5,08,530	3.2
T_{10}	Humicil @ 1%	1,59,420	19.68	7,87,200	6,27,780	3.9
T_{11}	Azospirillum @ 4%	1,61,920	19.95	7,98,000	6,36,080	3.9
T_{12}	Azospirillum @ 8%	1,69,920	26.30	10,52,000	8,82,080	5.2
T_{13}	Control	1,53,920	14.03	5,61,200	4,07,280	2.6

Note: price of flowers Rs. 40/Kg

Table 2: Effect of biostimulants on economics of seed production in China aster cv. Kamini

Treatment No.	Treatment details	Total cost of cultivation (Rs./ha)	Seed yield (q/ha)	Gross returns (Rs./ha)	Net returns (Rs./ha)	Benefit cost ratio
T_1	GA_3 @ 100ppm	1,67,270	4.26	21,30,000	19,62,730	11.7
T_2	GA_3 @ 200ppm	1,74,620	4.57	22,85,000	21,10,380	12.08
T_3	NAA @ 100ppm	1,71,620	2.70	13,50,000	11,78,380	6.9
T_4	NAA @ 150ppm	1,67,720	3.24	16,20,000	14,52,280	8.7
T_5	Boron @ 0.2%	1,60,220	3.34	16,70,000	15,09,780	9.4
T_6	Boron @ 0.3%	1,60,370	3.41	17,05,000	15,44,630	9.6
T_7	Biovita @ 0.5%	1,62,720	3.45	17,25,000	15,62,280	9.6
T_8	Biovita @ 1%	1,65,520	3.41	17,05,000	15,39,480	9.3
T_9	Humicil @ 0.5%	1,62,670	3.34	16,70,000	15,07,330	9.3
T_{10}	Humicil @ 1%	1,65,420	3.51	17,55,000	15,89,580	9.6
T_{11}	Azospirillum @ 4%	1,67,920	3.31	16,55,000	14,87,080	8.9
T_{12}	Azospirillum @ 8%	1,75,920	4.47	22,35,000	20,59,080	11.7
T_{13}	Control	1,59,920	2.66	13,30,000	11,70,080	7.3

Note: price of seeds Rs. 5000/Kg.

References

1. Chaitra R, Patil VS. Integrated nutrient management studies in China aster. Karnataka J. Agric. Sci. 2007;20(3):689-690.
2. Dorajeerao AVD, Mokashi AN, Patil VS, Venugopal CK, Lingaraju S, Koti RV. Effect of foliar application of growth regulators on growth, yield and economics in garland Chrysanthemum, Karnataka J. Agric. Sci.2012;25(3): 409-413.
3. Harish MS. Studies on method of breaking dormancy, nutrient levels and corm size on growth, yield and quality of gladiolus. M.Sc., thesis, University of Agricultural Sciences, Bengaluru, Karnataka (India), 2014,95.
4. Harshavardhan M. Integrated nutrient management on growth, flower yield and post-harvest quality of carnation (*Dianthus caryophyllus* l.) cv. big mama under polyhouse condition. Ph.D. thesis, University of Agricultural Sciences, Bengaluru, Karnataka, 2012,100.