

EFFECTS OF BIOREGULATORS ON GROWTH OF *ACACIA FERRUGENIA* AND *A. LEUCOPHLOEA* SEEDLINGS RAISED IN NURSERIES

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An attempt was made to investigate the significance of three bioregulators, namely, Mixtalol ($\text{CH}_3(\text{CH}_2)_{30}\text{CH}_2\text{OH}$), Vipul ($\text{CH}_3(\text{CH}_2)_n\text{CH}_2\text{OH}$) and Miraculan ($\text{CH}_3(\text{CH}_2)_{28}\text{CH}_2\text{OH}$) on *Acacia ferrugenia* and *A. leucophloea* saplings under nursery conditions. The bioregulators are tricontanol, i.e. long chain aliphatic alcohol and have been proved to be able to enhance growth and regulate processes related to production (Eriksen *et al.* 1991).

The experiment was conducted at the Soil and Water Conservation Research and Demonstration Centre, College of Technology and Agricultural Engineering, Udaipur, India. Uniform size seeds of *A. ferrugenia* and *A. leucophloea* were surface sterilised and subjected to hot water treatment. The seeds were then transferred to polythene bags (25 × 10 cm) filled with a mixture of soil and farm yard manure at 3:1 ratio. The soil used was clay loam with pH 7.4, EC 0.006 mmhos cm^{-1} , organic carbon 0.36%, available N 295.2 kg ha^{-1} , available P 21.5 kg ha^{-1} and available K 355.4 kg ha^{-1} . Two seeds were sown in each polybag. Watering was done as required. After three weeks, culling was performed to retain one healthy seedlings in each polybag. The seedlings were then divided into 10 groups. Group 1 served as control while groups 2 to 10 were given scheduled treatments of Mixtalol, Vipul or Miraculan. The regulators were foliar sprayed at 45 and 90 days after sowing and the concentrations used were 2, 4 and 6 ppm. The polybags were arranged in beds containing 40 seedlings (polybags) of each species in each group in completely randomised block design. A total of 10 seedlings of each species in each treatment were uprooted after 15 days of last spray, and after washing, measured for shoot length, collar diameter, root length and dry weights of root and shoot.

Results of the experiment showed that application of the three bioregulators improved growth of *A. ferrugenia* and *A. leucophloea*. However, treatments of both species showed that bioregulators were optimum at 4 ppm concentration; 6 ppm showed no significant improvement. Mixtalol at 4 ppm increased shoot length, collar diameter, root length, root weight plant^{-1} and shoot weight plant^{-1} by 45.3, 92.3, 58.7, 72.2 and 59.2% in *A. ferrugenia* and 87.3, 60.0, 54.6, 63.3 and 57.9% in *A. leucophloea* over control respectively. Vipul and Miraculan were also significantly effective in increasing growth but the increase was less compared with Mixtalol. Thakur and Thakur (1992) also recorded maximum increase in shoot length and dry weight of *A. catechu* when treated with 4 ppm Mixtalol.

The results of this investigation clearly delineate the capabilities of these regulators to promote growth. The significant increase in dry weight of plants treated with regulators appears to be contributing towards stimulating growth processes. Regulator increases photosynthesis, water uptake and nutrient uptake but reduces photorespiration, thereby, enhancing growth rate (Skogen *et al.* 1982).

Table 1 Effects of bioregulators on growth and dry weights of root and shoot

Treatment	<i>Acacia ferrugenia</i>					<i>Acacia leucophloea</i>				
	Height (cm)	Collar diameter (cm)	Root length (cm)	Root weight plant (g)	Shoot weight/ plant (g)	Height (cm)	Collar diameter (cm)	Root length (cm)	Root weight plant (g)	Shoot weight/ plant (g)
Control	56.3	0.26	23.0	1.15	2.70	27.5	0.20	26.0	0.60	0.76
Mixtalol										
2 ppm	69.8	0.40	31.0	1.60	3.72	41.0	0.27	34.6	0.80	1.02
4 ppm	81.8	0.50	36.5	1.98	4.30	51.5	0.32	40.2	0.98	1.20
6 ppm	84.0	0.51	37.6	2.07	4.42	53.5	0.34	42.5	1.04	1.28
Vipul										
2 ppm	67.2	0.38	29.2	1.54	3.62	37.5	0.26	33.5	0.79	0.99
4 ppm	76.1	0.46	33.9	1.89	4.13	47.0	0.31	38.5	0.92	1.16
6 ppm	78.3	0.47	34.9	1.92	4.24	50.0	0.33	40.5	1.00	1.20
Miraculan										
2 ppm	64.7	0.37	28.2	1.49	3.45	36.5	0.25	31.5	0.75	0.95
4 ppm	74.3	0.45	32.7	1.81	4.00	46.5	0.29	36.8	0.88	1.10
6 ppm	76.0	0.46	34.3	1.84	4.13	48.5	0.31	38.8	0.94	1.16
CD (p = 0.05)	8.32	0.055	4.02	0.240	0.350	5.20	0.032	4.20	0.110	0.130

Conclusions

The assessment of performances of three bioregulators, namely, Mixtalol, Vipul and Miraculan in terms of shoot and root growth showed that there were no significant differences between the bioregulators within the concentrations used. However, optimum performance was obtained when using Mixtalol at 4 ppm.

References

- ERIKSEN, A. B., AELLDEN, C., SKOGEN, D. & HILSEN, S. 1991. Comparative analysis of the effect of tricontanol on photosynthesis, photorespiration and growth of tomato (C_3 plant) and maize (C_4 plant) *Planta* 152: 44–49.
- SKOGEN, D., ERIKSEN, A. B. & NILSEN, S. 1982. Effect of tricontanol on production and quality of flower in *Chrysanthemum morifolium* Ramet. *Horticulture Science* 18: 87–92.
- THAKUR, P. S. & THAKUR, A. 1992. Effect of two bioregulators on growth potential and stomatal characteristics in *Acacia catechu* during early growth phase. *Indian Forester* 118(11): 807–812.