GAU Res. J. 1990. 16 (1) : 60-62

Groundnut Response to Growth Regulators

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Spectacular results have been reported on the effect of hormones on fruit crops especially ber (*Zizyphus mauritina* Lamk) in Saurashtra region of Gujarat (Patel and Patel, 1979) and also on groundnut elsewhere (Dasgupta, 1975; Gardner, 1983; Reddy and Patil, 1981). Groundnut being the principal crop of the region, no information on the effect of hormones on yield of this crop is available. A pot experiment was therefore, conducted to study the effect of different growth retardants and growth promoters at two concentrations on growth, yield and quality of groundnut (*Arachis hypogaea* L.) variety 'GAUG 1'.

The experiment was conducted in earthen pots of 45 cm diameter and 40 cm deep during 1982. Each pot contained 30 kg clay soil which had pH 7.9, EC 0.50 mmhos/cm, $CaCO_3$ 38 per cent, organic C.O. 88 per cent, available P 45 kg P_2O_5/ha and available K 370 kg K_2O/ha. The soil was well mixed with a basal dose of 20 ppm N and 40 ppm P as urea + diammonium phosphate. Seven bold and healthy thirum treated seeds were sown in each pot, but a week after germination they were thinned to three. The treatments consisted of five hormones each at two concentrations, besides two contorls (Table 1). Each hormone was applied at 40 and 60 days after sowing. The crop was irrigated as and when required until 7 days before its harvesting at maturity. The ancillary observations such as length of internode, length of side branch, plant height, shelling percentage, pod and haulm yields were recorded. Protein and oil contents from kernel were also determined using standard procedures as described in A. O. A. C. (1950).

The data (table 1) show that CCC and SADH significantly decreased the length of internodes and side branches, whereas reverse was true in case of GA_3 and IBA. The results suggest that the auxin activity in the plant might have been inhibited due to the application of the growth retardants which act more or less as antiauxins. Similar reduction in size of side branches due to growth retardants was reported by Reddy and Patil (1981). Gardner (1983) also noted retardation in vegetative growth of groundnut due to SADH.

Spraying of IBA @ 25 ppm and GA_3 @ 50 ppm significantly increased plant height. Spray of water alone also enhanced while that of SADH @ 500 ppm retarded the plant height, but these treatments failed to reach the level of significance over control.

In general, an increase in the pod yield ranged from 10 to 55 per cent due to different hormone treatments over absolute control. The highest pod yield was recorded with the treatment IBA @ 50 ppm followed by GA_3 @ ppm and IBA @ 25 ppm, which were at par with each other, but significantly superior to absolute control. The treatment of SADH @ 500 ppm also produced significantly higher pod yield over absolute control. The maximum haulm yield was noted with the application of CCC @ 100 ppm, followed by GA_3 and IBA at both the levels, which were at par with each other. However, all these treatments proved significantly superior over control.

Shelling percentage was not affected by the treatments, however, they followed the similar trend in respect of test weight and oil yield. Dasgupta (1975) observed significant superiority of CCC @ 500 ppm over control in increasing pod and oil yield.

A significant improvement in protein content was recorded with spray of only SADH at both the levels over control, the maximum value of 19.8 per cent was with its 500 ppm level. IBA @ 25 ppm out yielded the other treatment except CCC at both levels in respect to oil content in kernel.

Among all the hormone treatments, spraying of IBA @ 25 ppm over control gave maximum net ICBR of 4.08. Although spraying of IBA @ 50 ppm gave net ICBR of 3.58 next in order, it gave the maximum net return among all the treatments. Thus, considering effect of IBA on quality and yield it may be concluded that spraying of this hormone @ 50 ppm and 60 days after sowing would be profitable.

(Received on 15th Febru. 1988)

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TABLE 1

Mean effect of different hormone treatments on grow h, yield and quality of groundnut.

Treatment	*Average internode length (cm)*	*Average length of side branch (cm)*	*Average plant height (cm)*	*Yield (g/pot)*			*Shelling (%)*	*Protein content (%)*	*Oil content (%)*	*Oil yield (g/pot)*	*Net ICBR*
				Pod	*Haulm*	*Harvest index (%)*					
Control (Absolute)	2.2	23.0	19.3	20.0	24.3	45.1	74.4	17.3	46.0	6.8	—
Control (Only water spray)	2.3	27.0	23.0	20.9	27.9	42.8	74.9	18.7	47.5	7.5	—
SADH @ 250 ppm	1.4	19.3	17.0	24.7	30.7	44.6	74.6	19.0	45.9	8.4	—
SADH @ 500 ppm	1.4	19.2	15.3	25.6	32.4	44.1	74.6	19.8	46.3	8.8	—
CCC @ 50 ppm	1.4	22.8	21.7	22.8	32.4	41.3	75.7	18.4	48.6	8.3	—
CCC @ 100 ppm	1.8	31.3	22.7	22.3	35.6	38.5	74.5	17.6	48.7	8.1	—
GA_3 @ 25 ppm	2.9	32.2	24.0	24.1	35.4	40.5	74.3	16.7	47.4	8.5	—
GA_3 @ 50 ppm	3.3	31.7	26.0	27.9	35.5	44.0	74.0	17.6	48.3	10.0	0.02
NAA @ 40 ppm	2.5	23.7	18.7	22.0	28.6	43.5	75.0	17.3	47.0	7.7	—
NAA @ 80 ppm	2.9	21.3	20.0	21.9	28.6	43.4	75.0	18.4	47.0	7.7	—
IBA @ 25 ppm	3.1	34.0	26.7	26.2	33.1	44.2	74.5	18.7	49.4	9.6	4.08
IBA @ 50 ppm	2.9	29.0	21.7	30.9	34.7	47.1	75.0	18.7	46.7	10.7	3.58
S. Em. ±	0.2	1.57	1.56	1.76	2.30	1.30	0.44	0.56	0.20	0.55	
C. D. @ 5%	0.7	4.54	4.50	5.10	6.68	3.76	N. S.	1.63	0.60	1.60	
C. V. %	17.0	10.0	10.0	12.0	12.5	12.0	10.0	5.0	1.0	11.0	

Note : Relative economics (Net ICBR) of the treatments have been worked out for only those treatments which showed significant superiority in both pod and haulm yield over absolute control. Plant polution was assumed to be 1.5 lakh plants/ha and the amounts of solution for 1st and second spray were to be 250 and 350 litres/ha.

The prices considered were : Pod Rs. 500 per q, Haulm Rs. 40 per q, SADH Rs. 20 per g, CCC Rs 7 per g, GA_3 Rs. 70 per g, NAA Rs. 5 per g, IBA Rs. 20 per g. Cost of spray Rs. 20 per spray.