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## Effect of PGR, chemicals and plant extract on seed germination and seedling growth of custard apple (*Annona squamosa*)

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**ABSTRACT :** The aim of this study was to evaluate the effect of PGR, chemicals and plant extract on seed germination and seedling growth of custard apple. The results of present investigation clearly showed the significant differences with respect to effect of seed soaking in 50 ppm GA<sub>3</sub> for 48 hrs on days required for germination, germination percentage, seedling height, stem diameter and number of leaves per seedling of custard apple. As these results are based on single trail extensive trials may be conducted to confirm the findings. Thus, it can be concluded that seed treatment of GA<sub>3</sub> at 50 ppm for 48 hrs was helpful to get higher germination and seedling growth of custard apple.

**KEY WORDS :** *Annona squamosa*, Custard apple, GA<sub>3</sub>, PGR, PPM, Seed germination

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Custard apple is generally classified as semi arid fruit fit very well to the waste land utilization programme which is currently being emphasized by Government also as way for solving unemployment problem of people in rural area in semi arid region. Seed germination of custard apple is uneven and irregular making sexual propagation difficult. Much experimental evidences support the concepts that specific endogenous growth promoting and inhibiting compounds are involved directly in the control of seed development, dormancy and germination (Black, 1980). Custard apple requires 35-50 days for potential germination (Hernandez, 1983). Irregular germination, in custard apple seeds may be due to dormancy or due to hard seed coat. Very limited work has been carried out on this aspect in different parts of the world indicating, the utility of GA<sub>3</sub> from 150-500 ppm is helpful for getting better germination of custard apple seeds (Banker, 1987; Stino *et al.*, 1996; Pawshe *et al.*,

1997; Ratan and Reddy, 2004). Therefore, pre treatment of custard apple seed with different organics and also chemicals is very important to improve germination.

In order to have uniform and prompt germination period and to avoid the problem of uneven and irregular germination and to get sapling either for planting or to be used as rootstocks the seed treatment of custard apple seed is of quite importance. Therefore, an investigation was conducted to find out effect of PGR, chemicals and plant extract on seed germination and seedling growth of custard apple.

A experiment was undertaken at nursery unit, Department of Horticulture, K.K. Wagh College of Agriculture, Nashik, in 2013-2014 along with Experiential Learning Module students of college. The experiment was laid out in Randomized Block Design with three replications. There were seven treatments comprised of T<sub>1</sub> : seed soaking in tap water for 24 hours, T<sub>2</sub>: seed

soaking in 50 ppm GA<sub>3</sub> for 48 hrs. T<sub>3</sub> : Seed soaking in mixture of cow dung 1 kg + cow urine 1 lit + 50 g jaggary in 10 lit of water (mixture is prepared 3 days before treatment) T<sub>4</sub>: seed soaking in 0.1 per cent HCl solution for 2 min. T<sub>5</sub> : seed soaking in hot water for 30 min. T<sub>6</sub> : seed soaking in extract of *Cynadon dactylon* for 24 hrs and T<sub>7</sub>: control. For substitute to chemicals and PGR organic substances were included in treatments which show better result on seed germination. After treatment fully soaked and bulged seeds were selected and sown at uniform distance in polythene bags. Each treatment consisted of 50 fresh seeds from fully ripened fruits of custard apple plumule emergence was taken as seed germination. The data on germination and seedling growth under different treatments were statistically analyzed.

**Statistical analysis :**

The obtained data was analyzed by statistical significant at P<0.05 level, S.E. and C.D. at 5 per cent level by the procedure given by (Gomez and Gomez, 1984).

**Effect on germination :**

The results in respect of days required for initiation of seed germination indicated that minimum days were required in T<sub>2</sub>, seed soaking in 50 ppm GA<sub>3</sub> for 48 hrs (27 DAS) and maximum days required in T<sub>7</sub>, control (32 DAS). The maximum germination percentage recorded in treatment T<sub>2</sub> i.e., seed soaking in 50 ppm GA<sub>3</sub> for 48 hrs at 30 DAS (16.67), 35 DAS (32) and 40 DAS (44.67) while minimum recorded in T<sub>7</sub> i.e., control (Table 1). These result are in accordance with results obtained by Ratan and Reddy (2004); Gawade (2008).

**Effect on growth of seedling :**

The height of seedling was maximum 7.44 cm, 8.57 cm, 12.70 cm at 40, 55, 70 DAS, respectively. Stem diameter of seedling was maximum in T<sub>2</sub> 0.90 cm, 0.94 cm, 1.06 cm at 40, 55, 70 DAS, respectively, also number of leaves per seedling was maximum in T<sub>2</sub> 4.66, 6.00, 8.66 at 40, 55, 70 DAS, respectively, when seeds treated with 50 ppm GA<sub>3</sub> for 48 hrs. Minimum number of leaves per seedling was 2.33, 3.33, 6.00 at 40, 55, 70 DAS, respectively recorded in treatment T<sub>7</sub> in control (Table 1).

This improvement in seed germination and seedling growth could be due to activation of dormant embryo of

**Table 1 : Effect of PGR, chemicals and plant extract on seed germination, seedling height stem diameter and no of leaves per seedling of custard apple (*Arnonia squamosa*)**

Sr. No.	Treatments	Germination (%)			Seedling height (cm)			Stem diameter (cm)			No of leaves per seedling		
		30 DAS	35 DAS	40 DAS	40 DAS	55 DAS	70 DAS	40 DAS	55 DAS	70 DAS	40 DAS	55 DAS	70 DAS
1.	T <sub>1</sub>	04.66	08	18	6.65	7.75	8.85	0.67	0.75	0.87	3.00	5.00	6.33
2.	T <sub>2</sub>	16.67	32	44.67	7.44	8.57	12.70	0.90	0.94	1.06	4.66	6.00	8.66
3.	T <sub>3</sub>	12.67	28	40	7.35	8.66	12.00	0.81	0.92	1.03	4.00	5.66	7.33
4.	T <sub>4</sub>	05.33	18	30	7.06	7.62	9.42	0.75	0.85	0.91	3.66	5.00	7.00
5.	T <sub>5</sub>	04.67	08	21.33	5.94	7.30	9.10	0.62	0.74	0.79	2.67	3.67	6.33
6.	T <sub>6</sub>	05.33	14.67	27.67	6.85	8.14	11.33	0.72	0.79	0.90	3.33	5.33	7.00
7.	T <sub>7</sub>	04.67	06.67	17.33	5.20	6.39	8.52	0.59	0.64	0.76	2.33	3.33	6.00
	S.E. ±	0.82	03.74	08.6	0.11	0.05	0.14	0.0003	0.0006	0.0007	0.12	0.25	0.20
	C.D. (P=0.05)	2.49	11.32	26.25	0.33	0.15	0.42	0.001	0.002	0.002	0.38	0.76	0.62
	CV (%)	20.39	20.34	17.95	8.67	4.99	6.31	4.50	5.61	5.36	18.25	17.97	11.32

seeds with gibberellic acid and also gibberellic acid treatment helps to increase cell division, cell elongation and cell multiplication which might have reflected into maximum seedling growth. These results are in accordance with results obtained by and Gawade (2008); Gholap *et al.* (2000).

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