

Effect of GA₃ on germination of certain oilseeds

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Abstract

Experiments were carried out to study effect of GA₃ on Seed germination of oil seeds like Groundnut, Sunflower and Soyabean during January – March 2014 using 'Blotter Paper method'. Different concentrations of GA₃ showed influence on the percentage germination as well as incubation period of the seeds. In all three seed types maximum percentage of seed germination was found in 50 ppm GA₃ (Groundnut- 84.4%, Soyabean-97.8%, Sunflower- 90%) while least percentage was found in control (Groundnut- 68.9%, Soyabean-75.53%, Sunflower- 73.33%).

INTRODUCTION

Oilseeds contribute 14% of the total area under cultivation in India. India is the fourth largest edible oil ecology in the world and contribute about 10% of the world oilseed production (Paroda, 2013). Gibberellic acid is one of the important plant growth hormones. Though main role of Gibberellic Acid is to promote growth. It has few other important effects (Hardy Jackson, 2015). Initially gibberellic acid was used commercially for improvement of quality and production of Grapes (Clore, 1965; Christodoulou, 1968; Morris, 1987) and Cherry fruits (Kupferman, 1989; Sive and Resnizky, 1988; Horvitz et al., 2003). Now a days it is used to improve growth and yield parameters of other plants like studied effect of Cabbage (Khairul Mazed, 2015) and found that growth and yield of the cabbage was maximum at 90 ppm of GA₃. Similar effect was recorded in Cow pea (Emonger and Ndambole, 2011), Linseed (Rastogi et al., 2013) etc. Gibberellic Acid is also used to improve Germination of seeds like *Asparagus sprengeri* Regelin (Dhoran and Gudadhe, 2012), *Digitalis purpurea* (Patil et al., 2012), Black gram and Horse gram (Chauhan et al., 2009). Since last decade oil demand is increasing and farmers are diverting from cultivation of oilseeds in India due to it's low yield

and high cost of production. Hence present work was undertaken to study effect of one of the important growth hormone GA₃ on the germination of main oil seeds Groundnut, Sunflower and Soyabean.

MATERIALS AND METHODS

To study the influence of growth hormones on the germination of oil seeds three most important oilseeds were selected i.e. Groundnut, Sunflower and Soyabean. Seeds were germinated in-vitro by blotter paper method. Initially seeds were surface sterilized with 1% copper sulphate solution and washed properly with sterile distilled water. Sterilized seeds were treated with different concentrations of GA₃; 10ppm, 20ppm, 30ppm, 40ppm and 50ppm for 10 min then kept in sterile petriplates containing water soaked blotter papers. Petriplates were incubated and observed daily for germination of seeds. Observations were recorded in triplicate for each parameter and average values were tabulated in the tables.

RESULT AND DISCUSSION

Present observation showed that GA₃ has influence on seed germination in two ways – GA₃ not only increase percentage germination of seed but also it





Table - No. 1 - Percentage Germination of Groundnut seeds.

	Control	10 ppm	20 ppm	30 ppm	40 ppm	50 ppm
DAI-1	0	0	0	0	0	0
DAI-2	0	13.3	17.8	31.1	31.1	33.3
DAI-3	24.47	35.5	40	60	60	62.2
DAI-4	37.77	44.5	51.1	66.7	64.47	68.9
DAI-5	60	68.9	71.1	80	77.77	80
DAI-6	68.9	73.3	73.3	80	77.77	84.4
DAI-7	68.9	73.3	77.8	80	77.77	84.4

Table - No. 2 - Percentage Germination of Soyabean seeds.

	Control	10 ppm	20 ppm	30 ppm	40 ppm	50 ppm
DAI-1	0	8.88	11.1	28.9	26.67	37.8
DAI-2	15.53	17.8	24.5	55.53	48.9	73.3
DAI-3	53.3	73.3	77.8	91.1	88.9	95.5
DAI-4	75.53	80	82.2	93.3	91.13	97.8
DAI-5	75.53	80	82.2	93.3	93.3	97.8

Table - No. 3 - Percentage Germination of Sunflower Seeds.

	Control	10 ppm	20 ppm	30 ppm	40 ppm	50 ppm
DAI-1	11.67	25	26.7	21.67	26.67	30
DAI-2	43.33	63.3	63.3	66.67	61.67	66.7
DAI-3	65	76.7	75	73.33	76.67	80
DAI-4	71.67	78.3	76.7	78.33	85	86.7
DAI-5	73.33	78.3	80	80	85	90
DAI-6	73.33	80	80	81.66	85	90

reduces time required for germination (Incubation period). In groundnut maximum germination (84.4%) was found in 50 ppm GA₃ while minimum percentage germination was found in control (68.9%).

Soyabean seed also shows response to the application of growth hormones. It has shown constant increase in percentage germination from 10 ppm to 50 ppm it was maximum in (97.8%) in 50 ppm GA₃ as compared to control (75.5%) it is very considerable in case of Soyabean.

As far as sunflower seeds are concerned different concentration of GA₃ shows notable increase in the percentage germination of seeds. It was maximum 90% in 50 ppm. In short all the oil seeds i.e. Groundnut, Soybean and Sunflower shows response to the different concentration of GA₃ and shows increase in the percentage germination of oilseeds with increase in the concentration of Gibberellic acid.

Same result were found by Deno, 1994 in Cactus seed; Ahmad *et al.*, (1998) in Wheat;

Chauhan *et al.*, (2009) in Black gram and Horse gram and Joshi *et al.*, (2010) in *Pyracantha crenulata*.

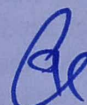
Beside increasing percentage germination of the seed treatment of seeds with GA₃ also showed effect on the time required for seed germination. Incubation period was reduced from 3rd day to 2nd day after incubation, in all treated seeds. Incubation period was also reduced where treated seeds showed germination on very next day after incubation. While non-treated germination was delayed for one day. Sunflower doesn't show any influence on the time required for Germination but on first day percentage was more (25 - 30%) in treated seeds while it was least or minimum in case of non-treated seeds (11.67 %). Similar result were recorded by Dhoran and Gudadhe (2005) in *Asparagus sprengeri* Regel in where he showed that seed treatment with GA₃ time required for germination was reduced from 21 days to 17 days.

REFERENCES

- Ahmad S, Anwar M and Ullah H, 1998. Wheat seed pre-soaking for improved germination. *J. Agron. Crop sci.* **181**:125-127.
- Chauhan J S, Tomar Y K, N Indrakumar Singh, Seema Ali and Debarati, 2009. Effect growth hormones on seed germination and seedlings growth of Black gram and Horse gram. *Journal of American Science*, **5**(5):79-84.
- Christodoulou, A, RJ Weaver and RM Pool, 1968. Relation of gibberellin treatment to fruit-set, berry development, and cluster compactness in *Vitis vinifera* grapes. *Proc. Amer. Soc. Hort. Sci.* **92**:301-10.
- Clore, WJ, 1965. Response of Delaware grapes to gibberellin. *Proc. Amer. Soc. Hort. Sci.* **87**:59-63.
- Deno N C, 1994. The critical role of gibberellins in germination and survival of certain Cacti. *Cactus and Succulent Journal*, **66**:28-30.
- Dhoran and Gudadhe, 2012. Effect of plant growth regulators on seed germination and seedling vigour in *Asparagus sprengeri* Regel. *International Research Journal of Biological Sciences*, **1**(7):6-10.
- Emongor VE. & Ndambole CM, 2011. Effect of gibberellic acid on performance of cowpea. *African Crop Science Conference Proceedings*, **10**: 87-92.
- Horvitz S., Godoy C., López Camelo AF, Yommi A, Godoy C, 2003. Application of gibberellic acid to 'Sweetheart' sweet cherries: Effects on fruit quality at harvest and during cold storage. *Acta Hort.* **628**:311-316.
- Jackson Hardy, 2015. *Gibberellins and Gibberellic acid: Biosynthesis, Regulation and Physiological effect*, Nova Science Pub Inc., 35-48.
- Joshi Sunil Chandra, Debarati, Preeti, Parihar S S and HCS Negi, 2010. Effect of gibberellic acid on seed germination of *Pyaracantha crenulata*. *Newyork Science Journal*, **3**(9):55-57.
- Khairul Mazed H. E. M. , Md. Shah Newaz Chowdhury , Md. Hafizur Rahman, Md. Ashraful Islam Pulok4 and Subrato Gope Partho, 2015. Interaction effect of different doses of ga3 and nitrogen on growth and yield of cabbage (*Brassica oleracea* var. capitata L.). *IMEJ.* **4**(5): 28-35.
- Kupferman EM, 1989. Cherry warehouse survey shows value of GA use. *Good Fruit Grower*, **40**:10-13.
- Morris Justin R., 1987. Effects of gibberellic acid (ga3) on yield and quality of grapes. *Proceeding Arkansas State Hort. Soc.* 108th Ann. Mtg., 76-79.
- Paroda RS, 2013. The India oilseed scenario: Challenges and opportunities <http://www.taas.in/documents/pub33.pdf>
- Patil MahendraLakshaman, Ahire Jitendra Gopinath and Nikam Tukaram Dayaram, 2012. The influence of growth hormones on the germination & seedlings development of *Digitalis purpurea* L. , *The Asian and Australian Journal of plant science and Biotechnology.* **6**(Special issue 1): 12-18.
- Rastogi Anu, Ameena Siddiqui, Brij K Mishra, Mrinalini Srivastava, Rawli Pandey, Pratibha Misra, Munna Singh and Sudhir Shukla, 2013. Effect of auxin and gibberellic acid on growth and yield components of linseed (*Linum usitatissimum* L.). *Crop Breeding and Applied Biotechnology*, **13**: 136-143.
- Sive A, Resnizky D, 1988. Storage trials with several cherry cultivars in 1987. *Alon Hanotea*, **42**:869-877.

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