

Studies on the effect of phytohormones on the seed germination in different cultivar of Sunflower (*Helianthus annuus* L.)

ADESH KUMAR AND V. K. BHATNAGAR

Deptt. of Botany, Hindu College, Moradabad (U.P.)

Abstract

The experiment on germination reveals the significant effect of Cycocel, GA₃ and ethephon on the germination percentage in different concentration in all the four varieties GHS-323 NSFH-145, MSFH-I and Kaveri. GA₃ showed significantly superior germination in all the concentrations as compared with cycocel and ethephon in cv. NSFH-145.

Key words: Cycocel, GA₃ and ethephon, cycocel and ethephon

Introduction

Phytohormones play an important role on the germination of seeds with the treatment of phytohormones, biochemical changes occurred in the seed before germination. The capacity of its changes may depend up the type of the phytohormones and its concentration and the duration of seed treatment. Pre-soaking seeds in number of crops have improved germination, Seedling establish ments and in some case stimulated the vegetative growth and hence crop yield (Amzollag et at, 1990; Kaur et at., 1998). Mauryal et al; (2003) studied the effect of size on the recovery and seed quality of sunflower seed. Sunflower offers immense opportunity as a crop to fill the need of edible oils. The wide adaptability, greater yield potential, short duration, photo in sensitivity and high oil content (35-45%) are some of the assets of this crop. Physiological characters such as photo synthetic efficiency, source and sink relation ship, translocation pattern and mineral nutritional requirements have not been analyzed to any extent in this crop. There is thus un urgent need to intensify the research on the basic Physiological and biochemical aspects in sunflower. GA₃ (200ppm) in creased the germination percentage and seedling height in sunflower cv, GHS-323(Adesh Kumar et al; 2010). During recent years, the application of phytohormones has increased tremendously for the betterment and improvement of agriculture and horticulture crops. The discovery of phytohormones has opened new vistas upon the horizon of crop production. They have provided man with a powerful means of stimulating the growth and development of the plants.

It has been confirmed by researches that from the very begining of life of a plant, there is a dominance of plant hormones/ regulators that governs all the vital activities inside the plant body at early stage till the death. Bisaria and Bhatnagar (1978) and Bhatnagar (1979) in *Solanum melongena* have observed a marked

increment in the length.

Materiels and Methods

The experiment petreplate culture for screening of susceptible variety has been carried out. Certified seeds of different cultivars have been obtained from Agronomy Department of G.B pant University of Agriculture and Technology, Pant Nagar (U.P.) and I.A.R.I. pusa, New Delhi. GA₃ obtained from central Drug House (P) Ltd, New Delhi. The seed germination experiment was carried out in plant physiology lab, Department of Botany Hindu College Moradabad (U.P.).

The optimum temperature for germination is 30.7c to 35c and it does not germinate below 15.6c. First the solution of GA₃, Cycocel, ethephon were prepared in different concentrations for imbibitions / soaking. The seeds were sterilized with 0.1% Hgcl₂ (Mercuric chloride) for 5 minutes and selected for experimentation and after this are soaking for 12 hours at 10, 25, 50, 100, 200, 400, & 800 ppm level of solution of GA₃, Cycocel and ethephon . After the soaking seeds were transferred in to petreplate and the petreplate kept in B.O.D. at room temperature (30-35c) for germination. Regular and uniform moisture is maintained by distil water. Germination counts were made with the emergence of the radical to a length of 2 cm after day of incubation. The mean values for the percentage germination were calculated for each treatment. Zack and Loy (1984) reported that GA₃ significantly enhanced thypocoty elongation in *Catrullus lanatus*. Calculated the growth parameter at periodic interval.

Results and Discution

The experiment on germination recorded the significant effect of phytohormones on the germination percentage in different concentration in all four cultivar i.e. GHS-323, NSFH,-145, MSFH-I and kaveri. The

Table 1: The Effect of phytohormones on the seed germination in different culture of sunflower (*Helianthus annuus* L.)

Phytohormones	conc. (ppm)	Germination %			
		GHS-323	NSFH-145	MSFH-I	KANERI
Control	D.W	58.15	75.30	64.20	65.10
Cycocel	10	66.80	84.30	73.20	76.90
	25	66.11	83.70	72.70	76.35
	50	65.20	83.40	72.30	76.00
	100	64.30	83.00	71.18	75.80
	200	64.00	82.50	70.90	75.00
	400	63.70	81.70	70.40	74.32
	800	63.80	81.00	70.10	70.00
GA ₃	10	79.87	97.03	82.92	86.12
	25	80.12	97.27	83.16	86.78
	50	80.53	97.28	83.50	87.12
	100	80.86	98.01	84.00	87.92
	200	81.19	98.66	85.42	88.00
	400	81.53	98.66	85.42	88.64
	800	82.00	98.80	85.92	88.90
Ethephon	10	62.16	80.21	69.20	77.10
	25	61.18	78.16	67.22	76.82
	50	60.02	77.20	65.12	75.12
	100	58.66	76.73	64.30	74.00
	200	57.60	76.20	63.22	73.50
	400	55.20	75.42	58.70	72.10
	800	50.30	65.30	57.00	70.00
C.D at%		02.10	02.70	2.30	2.50

first germination count was taken after 10th days of soaking. All the concentration of Cycocel showed significant an increment in germination percentage over control in all the four varieties. The maximum percentage (84.30%) was recorded in NSFH-145 followed by Kaveri (76.35%) and MSFH-I (70.90%) and GHS-323 (63.80%) in different concentration of Cycocel, ethephon showed a declined in germination parentage with increasing concentrations. The maximum

percentage (80.21%) was recorded in 10 mg and minimum percentage (65.30%) was observed in 800 mg / l in NSFH-145 Minimum percentage (50.30%) was recorded in GHS-323 at 800 mg / l. GA₃ showed the significant (P < 0.05) effect on germination percentage with increasing concentrations all the varieties. The maximum percentage (98.80%) was

observed in 800 mg / l showed in NSFH-145 while lower concentrations (10, 25, 50, 100, and 200mg /l) showed a decline trend of percentage in germinating of seeds.

Conclusion

The experiment on germination reveals the significant effect of Cycocel, gibberellic acid and ethephon on the germination percentage in different concentration in all the four varieties i.e GHS-323 NSFH-145, MSFH-I and kaveri. GA₃ showed significantly superior germination in all the concentration as compared with Cycocel and ethephon .Higher concentrations of phytohormones showed a marked increment in fresh weight, dry weight and water content over control.

References

- Adesh k., Bhatnagar V.K. and Yadav L. (2010). Studies on the effect of GA₃ on germination percentage and seedling height of sunflower (*Helianthus annuus* L.) CV. GHS-323. The Journal of rural and Agricultural Research. 10(2). 84-85.
- Amzallag, G. N. H. R. Lener and Apoljakoff- mayber, (1990): exogenous ABA as a modulator of the response of sorghum to high salinity. J. exp. Bot., 541: 1529-1534.
- Bisaria, A.K (1979): - Influence of ethephon on growth sex-expression and yield in okra (*Abelmoschus esculents* (L) Moench). Philippines Agric 2 (3): 37-38.
- Bisaria, A. K. and Bhatnagar, V.K.(1978): - Influence of ethrel, Cycocel and their combination on Carbohydrate in leaf and fruit of Okra. (*Abelmoschus esculents* (L) Moench). Abstract. The National acad, of Science. India. Symposium on Environmental adaptation and Distribution.
- Kaur, S., A.K Gupta and Kaur, N. (1998): - GA₃ and kinetin partially reverse the effect of water strees on germination and seedling growth. Plant growth Regul. 25: 29 -33.
- Zack, C.D and Loy, J.B (1984): -Comparative effect of gibberellic acid and N6 Benzyl adenine on dry matter partitioning and somatic and water potentials in seedling organs of dwarf watermelon. Jour Plant Growth Regul. 3: 65-73.