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Short Communication

Enhancement of plant potential using IAA

Chandan Kumar Pati
Department of Botany, Saldiha College (Affiliated to Bankura university), Saldiha-722 173, Bankura, West Bengal, India
cpbotany@yahoo.co.in

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Abstract

Pretreatment of horse-gram (Dolichos biflorus L.) seeds with indole acetic acid (IAA) for 4 hours (2+2 instalments) before accelerated ageing treatment (99.1% RH and 32±2°C) for the durations of zero(0) to 30 days slowed down the rapid loss of percentage germination and reduced percentage field emergence because of ageing. Performance of the plants was found to be much better in the IAA pretreatments as indicated by the higher protein content and activity of peroxidase enzyme. Results, therefore, pointed out that the pretreated seeds achieved higher seed potential and thus enhanced the production of healthier plants.

Keywords: Seed storage, seed potentiation, seed deterioration, seed germination, crop seed, storage life.

Introduction

Maintenance and retention of vigour of seeds in tropical and subtropical countries like India is a matter of serious concern to the crop growers because of high temperature and high RH prevailing in major parts of the country almost throughout the year[1-3]. The efficacy of several classes of chemicals on seed potentiation has also been reported. However, the said field of seed technology is still remains less explored till date[4,5]. Keeping the above problem in mind, this is aiming to analyze the role of indole acetic acid (IAA) for the enhancement of seed potential of a horse-gram species under storage which directly reflected in the plant health of the said species.

Materials and methods

Seeds of horse-gram (*Dolichos biflorus* L.) were presoaked separately in the aqueous solution of indole acetic acid (IAA, 100ppm) and distilled water as control for 4 hours (2+2 installments) after careful washing with 0.1% $HgCl_2$ for 90 seconds. Pretreated seeds are sun dried to their previous dry weight. Pretreated seed lot was then stored under 99.1% RH. This was kept for 30 days at room temperature in the laboratory. Data were recorded at 10 days interval (zero/10/20/30 days) of ageing treatment. Percentage seed germination data were recorded as per the ISTA[6]. Plant potential in terms of few reliable indices were determined from the plants of 30 and 60 day old grown from the accelerated aged seeds (zero and 30 days). Protein estimation was done from leaves of the plants as per the method and Lowry *et al.*[7]. Content and assaying of peroxidase enzyme was done as per Kar and Mishra[8] and Fick and Qualset[9] respectively. All the data were statistically analysed at least significant difference (LSD) level[10].

Results and discussion

Results indicate that horse-gram seeds treated with IAA reduced the loss of germination and enhanced seedling establishment (Table-1) and reduction of level of protein and activity of peroxidase enzyme (Table-2) during ageing. The common criteria for the certification of poor seed vigour are the poor germination of seeds and field emergence capacity[11]. In the present study, the IAA-influenced reduction of loss of seed germination and seedling establishment indicates the storage potential enhancement property of the experimental chemical.

Table-1: Percentage germination and percentage (%) field emergence of horse-gram seed species pretreated with IAA (100ppm).

Pretreatments	% germination				% field emergence			
	Days after ageing							
	0	10	20	30	0	10	20	30
Non-treated	100	62.4	42.5	27.5	88.0	52.5	30.0	NA
IAA	100	70.4	53.2	34.12	90.2	61.2	43.0	NA
LSD (P=0.05)	NC	1.01	2.81	1.01	NS	3.70	2.00	-

NA: Nonattainment of germination, NC: Not calculated, NS: Not significant.

Table-2: Protein contents and activity of peroxidase enzyme in horse-gram plants raised from accelerated ageing of seeds pretreated with IAA (100ppm).

Pretreatments	Protein				Peroxidase			
	Plant age (days)							
	30		60		30		60	
	Days after ageing							
	0	30	0	30	0	30	0	30
Non-treated	16.49	12.25	17.25	18.32	43.8	39.7	65.9	41.7
IAA	20.37	16.89	22.50	25.23	48.2	44.6	78.7	50.4
LSD (P=0.05)	1.50	1.03	1.13	1.54	0.19	2.07	3.05	2.00

Available reports show that during seed ageing the loss of some vital cellular components including protein, carbohydrates, nucleic acids, enzymes etc. occurred[12-16]. The overall data in the experiment thus indicates the efficacy of IAA on retention of plant potential.

Conclusion

It can be concluded from the present observations that the experimental seed treating agent, IAA hardened the pretreated seeds considerably during ageing which ultimately effected at the metabolic level of both seed and seedling and reflected in concomitant enhancement of plant potential.

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