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SHORT COMMUNICATION

Seed potentition and enhancement of plant potential of a mungbean species using plant extract

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ABSTRACT

Pretreatment of mungbean (*Vigna radiata*) seeds with leaf extract of tulsi (*Ocimum sanctum*) for 4 hours before accelerated ageing treatment (99.5% RH and $32\pm 2^\circ\text{C}$) for different durations for 30 days slowed down the ageing-induced rapid loss of seed germination. Plant performance was found to be much better developed from seeds which underwent plant extract pretreatment measured in terms of few reliable indices. Plant potential was also higher in the pretreatment as evidenced from the treatment-induced higher chlorophyll level as well as activity of catalase enzyme. Results, therefore, pointed out that the plant extract-pretreated seeds retained higher seed vigour and produced healthier plants inspite of experiencing accelerated ageing treatment.

Keywords: Mungbean, Tulsi, Plant potentiaion, Chlorophyll, Catalase, *Ocimum sanctum*, *Vigna radiate*

1. INTRODUCTION

The problem of retention of seed vigour in India is much more acute because of extremely high relative humidity (RH) prevailing during the major part of a year and which is very

conducive to the growth of microorganisms, particularly fungi [1]. As most crop seeds require storage for either one or several planting seasons, agriculturists and horticulturists of this region are often handicapped with respect to maintenance of standard seed vigour under ambient storage environment. Keeping the problem for the maintenance of higher plant potential in mind, an attempt was made in this investigation for the enhancement of plant potential of a mungbean species having viability problem. Present experiment was performed under accelerated ageing condition by imposing high relative humidity with a view to maintaining a uniform adverse storage condition and also to obtain expeditious results [2-4]. Thus, the major objective of this work was to test the efficacy of the leaf extract of tulsi (*Ocimum sanctum*) on the seed potentiation and enhancement of plant potential of a mungbean species.

2. MATERIALS AND METHODS

After surface sterilization (0.1% HgCl₂ for 90 seconds) the seeds of mungbean (*Vigna radiata* L.) was presoaked in the aqueous solution of leaf extract of tulsi (*Ocimum sanctum*) 25g in 1000 ml distilled water of each for 4 hours and then dried back to the original dry weight of the seeds. The pretreated seed lot was taken in the porous cloth bag and stored in a desiccator in which 99.5% relative humidity (RH) was preimposed within it and the experimental set-up was kept at 32 ±2 °C for 30 days allowing the seeds to experience forced ageing treatment.

From the seed lots germinability and field emergence capacity of seeds were made after 0, 10, 20 and 30 days of accelerated ageing treatment. To analyse the percentage germination, seeds were transferred to separate Petri dishes containing filter paper moistened with distilled water. Germination data were recorded following the International Rules for Seed Testing [5] and field emergence capacity was recorded after 10 days of seed sowing. Growth and biochemical parameters of the plants were recorded from the leaves of the 30 and 60 days old plants raised from the 0 and 30 days of accelerated ageing seeds. Extraction and estimation of chlorophyll from leaves was done by the method of Arnon [6]. Activity of catalase was analysed following the method of Snell and Snell as modified by Biswas and Choudhuri [7-8]. The assaying of the enzymes was done as per the methods of Fick and Qualset [9]. Statistical analysis of the data was done in terms of least significant difference (LSD) and as per the method of Panse and Sukhatme [10].

3. RESULTS AND DISCUSSION

Results showed that pretreatment of mungbean seeds with tulsi leaf extract significantly alleviated the ageing-induced loss of germination and enhanced field emergence capacity under accelerated ageing condition (Table 1). Reduced seed germinability and field emergence capacity are considered to be the important visible criteria for the evaluation of poor seed vigour [11]. In this investigation, the plant extracts-induced arrestation of loss of seed germination and field emergence capacity are indicative of retention of seed viability property of the experimental tulsi plant extract. Accelerated ageing treatment impaired field performance of experimental plants as evident from the reduction of levels of chlorophyll as well as activity of catalase enzyme (Table 2). The plant extract-induced alleviation of the deleterious effects of ageing on the overall metabolism of experimental plant thus indicates the retention of potential

status of the plants by the leaf extract used in this experiment. Chlorophyll and catalase are regarded as reliable indices of vigour status of plants. Catalase is generally used as very reliable indices for the evaluation of seed viability [12-13]. In this investigation, comparatively better plant health and higher metabolic status of mungbean plants, raised from the plant extract-treated seeds, are indicative of invigouration of seeds under storage.

Table 1. Effect of seed pretreatment with leaf extract of tulsi (25g in 1000 ml water) on percentage germination and field emergence capacity of mungbean seed species stored under accelerated ageing condition for 30 days.

Treatments	Percentage germination				Field emergence capacity (%)			
	Accelerated ageing (days)							
	0	10	20	30	0	10	20	30
Control	100	86.0	67.0	38.00	84.00	56.00	33.00	NA
Tulsi	100	94.0	85.0	51.00	92.00	74.00	45.10	NA
LSD (P=0.05)	NC	4.00	5.00	2.00	NS	4.00	5.00	-

NA: Nonattainment of germination; NC: Not calculated; NS: Not significant

Table 2. Effect of seed pretreatment with leaf extract of tulsi (25g in 1000 ml water) followed by accelerated ageing treatment for 30 days on changes of chlorophyll content and catalase activity in leaves of mungbean plants.

Treatments	Chlorophyll (mg/g fr. wt.)				Catalase (unit/h/g fr. wt.)			
	Plant age (days)							
	30		60		30		60	
	Accelerated ageing (days)							
	0	30	0	30	0	30	0	30
Control	2.35	1.06	3.09	0.88	33.8	9.7	15.9	8.4
Tulsi	2.48	2.20	4.37	1.28	38.2	14.6	18.7	11.4
LSD (P=0.05)	1.10	1.05	1.14	0.60	1.08	1.07	3.05	1.09

4. CONCLUSIONS

It can be concluded from the investigation that the plant extract-induced retention of seed viability and plant metabolism clearly indicate the hardening or invigouration property of the pretreating agents. And such hardening effect on mungbean seeds was reflected in it's plant metabolism.

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