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Short Communication

Herbal Manipulated Seed Potentiation of a Medicinal Legume

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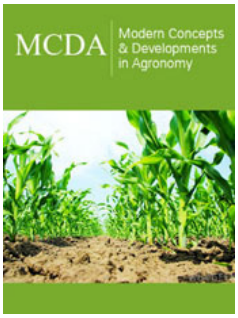

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Abstract

Chickpea seeds were pretreated with aqueous solution of leaf extract of nishinda (*Vitex negundo*) 50g in 500ml distilled water for 2 hours before forced ageing treatment (100% RH and 32±2° C) for different durations (0 to 45 days). Seeds showed better performance, measured in terms of few reliable physiological indices after pretreatment. The effect of the herbal extract on enhancement of seed potentiation under forced ageing is apparent in this investigation.

Keywords: Nishinda; Chickpea; Seed potentiation; Herbal manipulation; Forced ageing

Introduction

Chickpea (*Cicer arietinum* L., Family: Fabaceae) is one of the earliest cultivated highly nutritious legume crops. Chickpeas are a remarkable source of proteins (20% to 24%) and carbohydrates (52% and 71%). Furthermore, it is the rich supply of dietary fibre, lipids, essential amino acids and a modest quantity of vitamins. It is completely devoid of cholesterol which making them an excellent dietary choice, especially for individuals who cannot afford or prefer not to consume animal protein. In addition to their protein and carbohydrate content, chickpeas also provide a wealth of other essential nutrients. They are a valuable source of dietary fibre, unsaturated fatty acids, beta-carotene and abundant in key minerals such as calcium, potassium, phosphorus, magnesium, iron and zinc etc. The potential health benefits associated with chickpeas position them as one of the most nutrient-dense grain legumes for human consumption. For instance, their high fibre content has the capacity to lower cholesterol levels and regulate post-meal blood sugar spikes, making them a nutritious choice for individuals managing diabetes [1].

It is also an important part of Indian cuisine, it is used in salads, soups and stews, and curry, in chana masala, and in other food products that contain channa. They may aid weight management, protect against chronic diseases and promote several other aspects of health. But, in the semiarid climate and High Relative Humidity (RH) the seeds of chickpea lost viability in a quicker rate.

Again, storage of seeds is a serious problem in tropical region like Bankura and surrounding areas in West Bengal state of India where high temperature and High Relative Humidity (RH) greatly influenced the seed ageing phenomenon. The problem of retention of seed vigour in India is much more acute because of extremely high relative humidity prevailing during a major part of a year and which is very conducive to the growth of microorganisms, particularly fungi. 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 regulation of seed potentiation in mind, an attempt was made in this investigation to develop suitable methods to minimizing the loss of seed viability in storage of a chickpea species having viability problem. The present experiment was conducted under accelerated ageing condition by imposing high RH with a view to maintaining a uniform adverse storage condition [2-8].

Although efficacy of several classes of chemicals viz. hormones, retardants, redox chemicals, phenols, vitamins and salts on maintenance of seed health under storage has been established this field of seed physiology still remains relatively less explored. Thus, the major objective of this experiment was to test the efficacy of the leaf extract of nishinda (*Vitex negundo*) on the regulation of seed viability of a chickpea seed species.

Materials and Methods

Immediate after surface sterilization with 0.1% $HgCl_2$ for 90 seconds, the seed sample of chickpea (*Cicer arietinum* L.) was presoaked with aqueous solution of leaf extract of nishinda (*Vitex negundo*) 50g in 500 ml distilled water for 2 hours and then dried back to the original dry weight of the seeds. The pretreated seed lot was taken in separate cloth bag and stored in a desiccator in which 100% Relative Humidity (RH) was provided. This experimental set up was kept at 32±20C for 45 days allowing the seeds to experience forced ageing treatment. From the seed lots germinability and field emergence capacity of seeds were made after 0, 15, 30 and 45 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 after seed soaking following the International Rules for Seed Testing [9], ISTA 1976 and field emergence capacity was recorded after 10 days of seed sowing. Statistical analysis of the data was done in terms of Least Significant Difference (LSD) which was calculated at 95% confidence limits and as per the method of Panse & Sukhatme [10].

Result and Discussion

Results showed that pretreatment of chickpea seeds with nishinda leaf extract significantly alleviated the ageing-induced loss of germination and enhanced field emergence capacity under accelerated ageing environment (Table 1). Reduced seed germinability and field emergence capacity are considered to be the important visible criteria for the evaluation of poor seed vigour [11-13]. In this investigation, the herbal induced arrestation of loss of seed germination and field emergence capacity are indicative of retention of seed viability property of the experimental plant extract. Thus, the results indicated that although deterioration is a common phenomenon in treated and control sample of the seed species, the catabolic processes within the treated seed sample remained somewhat subdued, thereby rendering them tolerant against unfavourable storage environment [2,8,14-17].

Table 1: Effect of seed pretreatment with leaf extract of nishinda (50g in 500ml water of each) on percentage germination and field emergence capacity of chickpea seeds stored under forced ageing condition for 45 days.

Treatments	Percentage Germination				Field Emergence Capacity (%)			
	Forced ageing (days)							
	0	15	30	45	0	15	30	45
Control	100	90.0	67.0	48.0	100.0	85.0	43.0	NA
Nishinda	100	96.0	84.0	65.0	100.0	92.0	67.0	35.0
LSD (P=0.05)	NC	4.00	6.0	2.0	NC	2.0	5.0	-

Note: NC: Not Calculated; NA: Non-attainment.

Conclusion

It can be concluded from the results of this investigation that the promising effect of the aqueous solution of leaf extract of *Vitex negundo* on enhancement of seed potential of chickpea species is much significant. Thus, enhancement of storage property of the seed pretreated herbal agent seems to be apparent from these experimental results.

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