



EFFECT OF ACCELERATED AGEING TEST ON SEEDLING CHARACTERS IN BLACK GRAM (*VIGNA MUNGO* (L.) HEPPER)

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Abstract

An experiment was carried out to study the accelerated ageing test in blackgram variety VBN-5, it was carried out in the Dept. of Genetics and Plant Breeding Laboratory at the Faculty of Agriculture, Annamalai university, Annamalai nagar. Cleaned and graded seeds of blackgram imposed with the following treatments *viz.*, Neem leaf powder @200 g per kg, Pungam leaf powder @ 200 g per kg, Prosopis leaf powder @ 200 g per kg, Nochi leaf powder @ 200 g per kg, *Rhizobium* biofertilizer @ 200 g per kg and *Azospirillum* biofertilizer @ 200 g per kg along with control were taken for study. Pelleted seeds of VBN-5 harvested and subjected to accelerated ageing test. Observations were recorded on, speed of germination, seed germination percentage, shoot and root length, dry matter production, seedling vigour index I and seedling vigour index II. The results, revealed that the seeds of pungam leaf powder @ 200 g per kg of pelleted seeds registered the best quality withstand accelerated ageing upto 5 days. The treated seeds maintain (60%) germination. Decrease in germination percentage related to reduction in seed vigour, accelerated ageing also decreased in seedling length and dry matter production.

Key words : Accelerated ageing test, seedlings characters, blackgram.

Introduction

Blackgram (*Vigna mungo*) is one of the important pulse crop of India having 26 percent protein with good source of phosphoric acid, calcium and vitamins like thiamine (B₁), riboflavin (B₂) and niacin (B₃). The major constraint in pulse production is low productivity in sub marginal soils which are having low fertility and with least care. The productivity could be improved by adoption of proper management techniques including seed. Seed pelleting is a pre sowing physical seed management techniques, in which growth promotive substances or any needy substances with protective, nutritive and invigorative function are applied on the seed to enhance the seed soil relationship at the rhizosphere region (Srimathi *et al.*, 2013) and there by enhance the initial seedling growth and productivity. Research on pelleting also highlighted the efficacy of organic herbal powder as filler material with better invigorative efficacy (Shasibhaskar *et al.*, 2012). In organic farming, development of eco-friendly production techniques using natural product is much warranted particularly in blackgram which has economic value as food product (Anbarasan *et al.*, 2016)

Accelerated ageing is an excellent forecaster of seed viability and seed storability. Seed ageing is known to cause appreciable changes in viability and to produce large number of changes in viability and produce large number of changes in qualitative and quantitative characters and can be used with case of inducing variability in peas (Purkar *et al.*, 1992). Seed ageing and deterioration are said to be irreversible, inexorable and inevitable processes, but rate of deterioration could be slowed down either by keeping the seed in good storage environment or by imposing certain seed treatment. In the developing countries like India, storage of seeds under controlled conditions is a costly affair. Storage potential of lots can be evaluated by using the accelerated ageing (AA) technique (Delouche and Baskin, 1973). Keeping these facts in mind, a study was undertaken in blackgram variety, Vamban 5 to improve the seed storability.

Materials and Methods

Seeds of blackgram, variety VBN 5 obtained from NPRC, Vamban served as the base material for the study. Field experiments were taken out at pot culture yard and subsequent laboratory analysis was conducted at Department of genetics and plant breeding, Faculty of Agriculture. Harvested seeds of blackgram variety, VBN-5 subjected to

accelerated ageing chambers maintained at 95 ± 2 percent relative humidity and a constant temperature of $40\pm 1^\circ\text{C}$ (Delouche and Baskin, 1973) for a period of five days. The experiment was conducted at room temperature $26\pm 1^\circ\text{C}$ in the Seed Technology Laboratory of Genetics and Plant Breeding (Table 1).

Table 1: Certification standard for accelerated ageing in blackgram variety VBN-5.

Accelerated ageing (days)	Germination (%)	Minimum seed certification standard (%)
5	60	75

Then the seeds are evaluated for the following characters.

Speed of germination: One hundred seeds of four replications were germinated in sand media as per the recommendations were germinated in sand media as per the recommendations of International Seed Testing Association (ISTA), (2007) in germination room condition (25°C and $95\pm 2\%$ RH) along with unpelleted seed. Daily counts were taken in each of the treatment and replication upto the germination period of 7 days (ISTA, 2007) and speed of germination was calculated as per Maguire (1962).

Seed germination percentage: At the end of the germination period, the number of normal seedlings, were counted and expressed as seed germination percent (ISTA) (2007).

Shoot and root length: In each of the treatments and replications, ten seedlings were selected at random and

measured for root length (the length between the collar region to the tip of primary root in centimetre) and shoot length (the shoot length from the collar region to tip of the true leaves in centimetre).

Dry matter production: The seedlings used for measuring shoot and root length were shade dried and then dried in a hot air oven at $80\pm 2^\circ\text{C}$ for 24 hours and cooled in desiccators containing calcium carbonate and weighed in mg and reported as dry weight of ten seedlings.

Seedling vigour index: vigour index values were computed adopting the following formula given by Abdul Baki and Anderson (1973) and the values were reported as whole number without unit.

Seedling vigour index I: Seed germination (%) x Total seedling length(cm).

Seedling vigour index II: Germination(%) x Dry matter production.

Statistical Analysis

The experimental design followed completely randomized design with required replications for laboratory experiment and pot culture experiment respectively; whenever necessary the values expressed in percentage were transferred into Arc Sin values before analysis. The critical difference (CD) was worked out at 5% ($P=0.05$) level and whenever 'f' value is non significant, it is denoted by "NS".

Table 2: Effect of accelerated ageing test on various seedling characters in blackgram

Treatment (T)	Germination (%)	Speed of germination	Shoot length (cm)	Root length (cm)	Seedling length (cm)	Dry matter production (g seedling ⁻¹⁰)	Vigour index I	Vigour index II
T ₀	58 (49.41)	10.08	10.43	10.00	20.43	0.07	1178.11	4.23
T ₁	59 (50.19)	10.73	11.93	10.80	22.73	0.11	1341.53	6.49
T ₂	67 (54.74)	11.08	14.23	11.47	25.70	0.13	1713.40	8.90
T ₃	64 (53.14)	10.92	13.26	10.85	24.11	0.12	1542.86	7.68
T ₄	59 (49.99)	10.14	10.95	10.03	20.98	0.09	1230.78	5.08
T ₅	63 (52.35)	10.61	11.75	10.50	22.25	0.10	1394.33	6.46
T ₆	61 (51.55)	10.34	11.90	10.17	22.67	0.08	1354.07	5.11
Mean	61 (51.63)	10.5596	12.06	10.55	22.61	0.10	1393.58	6.28
SE	1.5635 (0.9235)	0.1632	0.1586	0.2252	0.2507	0.0080	42.27	0.5126
CD(P=05)	3.3537 (1.9810)	0.3501	0.3401	0.4831	0.5377	0.0171	90.67	1.0996

Results and Discussion

In the present investigation, accelerated ageing of seeds by providing favourable condition for seed deterioration such as temperature (40°C) and high relative humidity 100% and assessing the subsequent performance of seed have been considered to be an easy and reliable method to storage behaviour of seed in relatively short time (Abdulbaki and Anderson, 1973 and Basu,1976). Near parallelism in deterioration process of the accelerated aged and naturally aged seeds was observed by Delouche *et al.*, (1973) with several species. According to them this method would serve as a tool to predict the storability of crop seeds within a short span of time.

Accelerated ageing for various days variable relative storability of cowpea seeds. The seeds that can resist changes in membrane are also able to maintain viability and quality (Bewley and Black,1985). Increase ageing period had a suppressed effect of germination, seeds which are treated with Pungam leaf powder @ 200 g per kg with stand accelerated ageing upto 5 days. The treated seeds maintain 60% germination. Decrease in germination percentage related to reduction in seed vigour, accelerated ageing also decreased in seedling length and dry matter production. Similar results were reported in peanut (Sung and Jeng, 1994).

From the present study, it was concluded that blackgram seeds pelleted with Pungam leaf powder exhibited higher germination, speed of germination, shoot length and root length, seedling length, dry matter production, vigour index I and vigour index II under laboratory condition. Pungam leaf powder pelleted seeds are also maintain with standard certification level of 75% after 5 days of accelerated ageing. This shows the storage potential of the blackgram variety VBN-5 Seeds.

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