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Effect of seed pelleting on seed quality parameters in blackgrm [*Vigna mungo* (L.) Hepper]

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Abstract
Laboratory experiment was conducted to study the effect of seed pelleting using plant leaf powders and biofertilizers on seed quality parameters of blackgram. Seed pelleting is the process of pelleting is given as a presowing seed treatment which act as a boon to the farmers. The seeds of blackgram were given pelleting treatments *viz.*, neem leaf powder, pungam leaf powder, prosopis leaf powder, nochi leaf powder, rhizobium biofertilizer, azospirillum biofertilizer and sown along with control. The results revealed that pungam leaf powder @ 200g per kg recorded the higher values when compared to other treatments under laboratory condition.

Keywords: blackgram VBN 5, plant leaf powders, biofertilizers, seed pelleting

Introduction
Blackgram [*Vigna mungo* (L.) Hepper] 2n=2x=22 popularly known as urdbean containing about 26 percent protein, which is almost three times that of cereals and belonging to the family Fabaceae. It ranks fourth among the major pulses cultivated in India. Blackgram supplies a major share of protein requirement of vegetarian population of the country. It is consumed in the form of split pulse as well as whole pulse, which is an essential supplement of cereal based diet. In India, blackgram occupies 12.7 percent of total area under pulses and contribute 8.4 percent of total pulses production. Among the pulses, the urdbean is grown both as pure and mixed crop along with maize, cotton, sorghum and other millets. Every adult needs a minimum consumption of 80g and 47g of pulses as per WHO and Indian Council of Medical Research respectively to meet the daily protein requirement.
The low productivity is also due to the lack of quality seed of high yielding varieties (Karivaratharaju and Ramakrishnan, 1985) [4]. Seed pelleting is the process of enclosing a seed with small quantity of inert material just large enough to produce globular unit of standard size to provide small amount of nutrients to young seedlings (Krishnasamy, 2003) [6]. The present study will emphasize on the effect of seed pelleting with various leaf powders and biofertilizers on seed and seedling characteristics of blackgram VBN 5.

Materials and Methods
The present investigation was carried out by using genetically pure seeds of blackgram variety VBN 5 obtained from National Pulse Research Station, Vamban, Pudukottai. Laboratory analysis was conducted at the Department of Genetics and plant Breeding, Faculty of Agriculture, Annamalai University, Chidambaram. The bulk seeds were cleaned manually to remove unwanted material from the seed lot.

Preparation of treatments for seed pelleting
The fresh leaves were collected separately and dried under shade condition. The shade dried leaves were powdered using mortar and pestle. A fine leaf powder was obtained by sieving through 0.10 mm wire mesh remove unwanted material and leaf debris. Biofertilizers *viz.*, Rhizobium and Azospirillum were added at the recommended level.

Treatment details
T_0 - Control
T_1 - Seed pelleting with neem leaf powder @ 200g / kg
T_2 - Seed pelleting with pungam leaf powder @ 200g / kg
T_3 - Seed pelleting with prosopis leaf powder @ 200g / kg
T_4 - Seed pelleting with nochi leaf powder @ 200g / kg
T_5 - Seed pelleting with biofertilizer rhizobium @ 200g / kg
T_6 - Seed pelleting with biofertilizer azospirillum @ 200g / kg

Germination test was conducted with 4 x 100 seed from each treatment was carried out in sand media in a germination room maintained at a temperature of 25±1 ºC and RH of 96±2% with diffused light. The final count based on normal seedling was recorded on seventh day and the mean germination was recorded in percentage (ISTA, 1999) [3]. Ten normal seedlings of each of the crop/treatment /replication were selected at random and measured using measuring scale for root length (the length between the collar region to the tip of primary root in centimeter), shoot length (the shoot length from the collar region to the tip of the true leaves in centimeter) and dry matter production of 10 seedlings^{-1} (ten normal seedlings were dried at first in shade and then in a hot air oven at 85±2 ºC for 48 h then cooled in desiccators containing calcium carbonate and weighed in milligram). Based on the results obtained, the vigour index values were computed as per Abdul-Baki and Anderson (1973) [1] and the values were reported as whole number without unit. In laboratory evaluation the characters *viz.*, germination (%), speed of germination (%), shoot length (cm), root length (cm), seedling length (cm), dry matter production, vigour index I and vigour index II were recorded the data collected were statistically analysed as per Panse and Sukhatme, 1985 for understanding the significance at 0.5 percent.

Results and Discussion

In pelleting process, the seeds are stamped using an adhesive and are filled with filler material are rolled in uniformity. The success of pelleting depends on the selection of filler material. Researchers expressed the beneficiary influence of different filler material such as leaf powder (Khatun *et al.*, 2011) [5], biofertilizer (Selvakumar *et al.*, 2012) [12] and combination of all these for obtaining improved planting value. In the present investigation, the blackgram seeds were pelleted with leaf powders and biofertlizers recorded highly difference among the seed pelleting treatments.

In this study, seeds were evaluated for their physiological qualities. Pungam leaf powder pelleted seeds (T_2) recorded the highest germination (93%), speed of germination (11.24), shoot length (14.17cm), root length (12.10cm),seedling length (26.27cm), dry matter production (0.29 g), vigour index I (2451.40) and vigour index II (27.37) when compared to untreated seeds (T_0) (Table 1). Similar results were reported by Srimathi *et al*. 2013 [13] in jatropha and Maheshwari (1996) [8] in soybean. Georgin Ophelia (2017) [2] reported that pelleting with pungam leaf powder @ 150 g kg^{-1} of seeds enhanced in seed quality parameters in blackgram.

Pungam leaf powder contains plant mineral nutrients like nitrogen (5.6%), phosphorus (P_20_5-0.9%), Potassium (K_2 0-3.l1%) and Calcium (Ca 0-1.0%) (Nadeem Binzia, 1992) [9]. Prasad (1994) opined that the plants leaf powder acted as wick by absorbing/regulating the soil moisture availability and thus enhanced better seed soil relationships, as indicated through higher seed and seedling quality characters of the pelleted seeds. In additionally the plant leaf powder contains the gibberellins like substance in addition to the saponins, nutrients, especially the micronutrient that might have synergistically interact with amino acid, trytophane to form the Indole Acetic Acid (IAA) (Lu *et al.*,1983) [7].

Table 1: Effect of seed pelleting on germination and seed quality characters in variety Vamban 5.

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	86 (68.31)	10.46	10.87	9.40	20.27	0.19	1749.27	16.69
T_1	90 (70.33)	10.70	12.02	10.98	23.00	0.25	2077.53	22.88
T_2	93 (75.05)	11.24	14.17	12.10	26.27	0.29	2451.40	27.37
T_3	91 (72.21)	11.03	13.40	11.57	24.97	0.27	2263.50	24.18
T_4	89 (70.33)	10.65	11.60	10.30	21.90	0.22	1941.67	19.81
T_5	88 (70.03)	10.66	13.17	11.47	24.63	0.26	2176.20	23.26
T_6	90 (71.26)	10.79	12.80	11.07	23.87	0.25	2140.00	22.41
Mean	90 (71.30)	10.79	12.58	10.98	23.56	0.25	2114.22	22.37
SE	0.4714 (0.4526)	0.1472	0.6261	0.3935	0.8678	0.0115	75.9422	1.0675
CD (P=05)	1.0112 (0.9709)	0.3157	1.3430	0.8441	1.8614	0.0248	162.8975	2.2898

Conclusion

Use of chemicals as pelleting materials are costly and causes natural hazard, where as botanicals are less costly, easily available to the formers, safe to handle and they can prepare easily. The study revealed that 200g pungam leaf powder pelleted seeds (T_2) recorded the higher values for germination percentage, speed of germination, shoot length, root length, seedling length, dry matter production, vigour index I and Vigour index II. Based on the results blackgram seeds pelleted with pungam leaf powder are highly suitable for seed pelleting than unpelleting and were followed by prosopis leaf powder.

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