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Enhancement of seed quality, growth and yield in blackgram through biological inputs

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Abstract

The seeds of black gram cv VBN 11 were treated with different biologicals in order to estimate their influence on seed quality, growth and yield parameters. Biologicals like 6% cow urine, 6% vermiwash, 6% panchagavya, 6% rhizobium, 6% goat urine and 6% azospirillum were used for the present study over control. The results revealed that the seeds treated with 6% panchagavya showed highest values for germination percentage (94%), root length (13.93 cm), shoot length (25.83 cm), seedling length (42.20 cm), seedling dry weight (0.49 g), vigour index I (3966.80) and vigour index II (46.06), field emergence (94.00%), plant height (40.12 cm), days to first flowering (24.70), days to 50% flowering (32.59), number of branches/plant (5.07), number of pods/plant (33.64), seed yield/ha (1246.96 kg) and 100 seed weight (6.23) over control.

Keywords: Vermiwash, biological, azospirillum, goat urine, vigour

Introduction

Black gram [*Vigna mungo* (L.) Hepper]; Fabaceae is one of the most important pulses grown throughout the country that provides cheapest source of dietary protein of around 26 per cent. Black gram is one of the most highly prized pulses having its origin in India and it is believed to be in cultivation from ancient times (Kaur *et al.*, 2024) [3]. The area of traditional cultivation of black gram is confined to the South Asia. The black gram yield was low because of different reasons that include poor management practices, various physiological, biochemical and inherent factors that were associated with the crop (De Lespinay *et al.*, 2010) [6]. Organic substances are known to influence a wide array of physiological parameters like promotion of photosynthesis, uptake of nutrients, improved seed quality etc., (Sharma *et al.*, 2013) [7]. Panchagavya, a traditional organic preparation derived from cow dung, milk, curd, ghee and coconut water is believed to have several beneficial effects on crops. Cow urine and goat urine contains nitrogen in the form of urea that also acts as a natural disinfectant. Azospirillum and vermiwash creates a potent organic growth stimulant that enhances nitrogen availability, hence a study was undertaken using all the techniques to assess the influence of biologicals on seed quality, growth and yield parameters in blackgram cv VBN 11.

Materials and Methods

Black gram seeds, VBN 11 were brought from National pulses research centre, Vamban, Tamil nadu. The biological products i.e., cow urine and goat urine were collected at Animal Husbandry division, Faculty of Agriculture, Annamalai University. Azospirillum, vermiwash, and Rhizobium were collected from the Department of Microbiology, Faculty of Agriculture, Annamalai university. Panchagavya was readily brought from the local farmers in Polivakkam, Thiruvallur. In order to prepare 6% solution, 6ml of cow urine, goat urine, panchagavya, vermiwash and 6 g of azospirillum, rhizobium each were taken separately and mixed individually in a beaker with 100 ml distilled water. The seeds were soaked in equal volume of 1:1 solution for 4 hours. The soaked seeds were dried back in original moisture content. The Field trial was conducted at farmer field, Polivakkam village in Thiruvallur. The laboratory experiment was carried out at the PG Laboratory, Department of Genetics and Plant Breeding, Faculty of Agriculture, Annamalai University, Chidambaram. The technique of random sampling was adopted for recording various characters in black gram.

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T₀: Control (Without treatment)
 T₁: 6% Cow urine
 T₂: 6% Vermiwash
 T₃: 6% Panchagavya
 T₄: 6% Rhizobium
 T₅: 6% Goat urine
 T₆: 6% Azospirillum

Results and Discussion

In the current experimental study it was noticed that black gram seeds when treated with 6% panchagavya showed higher seed quality parameters such germination percentage (94%), root length (13.93 cm), shoot length (25.83 cm), seedling length (42.20 cm), seedling dry weight (0.49 g), vigour index I (3966.80) and vigour index II (46.06) over control (Table 1). These results were agreed with the findings of Srimathi *et al.* (2014) [1] in biofuel crop, vijaya and krishnasamy (2014) in rice crop. The highest germination percentage may be due to that panchagavya contains beneficial micro organisms that produce plant growth promoting substances. Improved root length is due to the essential macro and micro nutrients that are crucial for root initiation and elongation. The hiked shoot length when treated with panchagavya was due to the presence of phytohormones that enhance metabolic activity and thus supports better growth. The plant growth promoting substances in panchagavya favours the rapid cell division and cell multiplication leads to the increased shoot length (vennela and jayanthi, 2008) [10]. The enhanced vigour index is linked to the rich composition of panchagava, that contains plant growth promoters i.e., Natural auxins (IAA)

and gibberellins (GA), beneficial microbes and vitamins, micro and macro nutrients and amino acids (Srinivasareddy A and Chaurasia AK, 2021) [5].

The seeds that were hardened with 6% panchagavya showed the higher values for the plant growth and yield parameters viz., field emergence (94.00%), plant height (40.12 cm), days to first flowering (24.70), days to 50% flowering (32.59), number of branches/plant (5.07), number of pods/plant (33.64), seed yield/ha (1246.96 kg) and 100 seed weight (6.23) over control (Table 2). These results are in conformity with findings of Vijayan and Krishnasamy (2014) [2] in rice. The increase in the above growth and yield parameters was due to the auxins in panchagavya, that attributes to the activation of cell division and extensibility of cell wall in the auxillary buds that had a enhancing effect in number of branches, leaves and also the other growth parameters in mung bean (Suchith Kumar C and Singh G, 2020) [8]. According to Prabhu *et al.* (2010) the application of panchagavya to seed might have induced the endogenous synthesis of native auxins results in an early active growth in plants. Panchagavya improves crop yield by enhancing multiple yield parameters through its rich content of beneficial micro organisms, nutrients and natural growth hormones (Patel *et al.*, 2018) [9]. Its application, contains IAA and GA₃ and cytokinins stimulates plant growth leading to increased branching biomass and better fruiting. Plants treated with panchagavya develop bigger leaves and denser canopy boosting photosynthesis and metabolic synthesis necessary for fruit and grain development (Shakunthala *et al.*, 2012) [4].

Table 1: Biological inputs on seed quality parameters in Blackgram cv. VBN 11

Treatment	Germination %	Root length (cm)	Shoot length (cm)	Seedling length (cm)	Seedling dry weight (g)	Vigour index I	Vigour index II
T ₀	80.00	10.46	18.99	29.45	0.39	2356.00	31.20
T ₁	83.00	11.80	21.43	33.23	0.42	2758.09	34.86
T ₂	85.00	11.40	23.00	34.40	0.45	2924.00	38.25
T ₃	94.00	13.93	25.83	42.20	0.49	3966.80	46.06
T ₄	92.00	13.49	25.00	39.86	0.47	3667.12	43.24
T ₅	87.00	13.00	22.10	35.10	0.43	3053.70	37.41
T ₆	88.00	12.10	20.00	32.10	0.46	2824.80	40.48
Mean	87.00	12.31	22.33	35.19	0.44	3078.64	38.78
SED	0.816	0.088	0.109	0.283	0.008	12.784	0.313
CD (P = 0.05)	1.768	0.190	0.237	0.612	0.018	27.684	0.678

Table 2: Biological inputs on growth and yield parameters in Blackgram cv. VBN 11

Treatment	Field emergence (%)	Plant height (cm)	Days to first flowering	Days to 50% flowering	No of Branches/plant	No of Pods/plant	Seed yield/ha (kg)	100 seed weight
T ₀	79.00	29.95	35.33	37.81	3.56	30.23	996.88	5.20
T ₁	81.00	31.57	31.83	36.42	4.45	31.96	1042.00	5.97
T ₂	83.00	33.32	31.00	36.18	4.21	32.39	1094.00	5.48
T ₃	94.00	40.12	24.70	32.59	5.07	33.64	1246.96	6.23
T ₄	92.00	38.56	26.50	33.00	4.91	32.71	1233.00	6.10
T ₅	88.00	36.55	28.51	33.30	4.11	31.27	1180.20	5.25
T ₆	85.00	37.00	30.30	34.71	4.32	32.18	1168.00	5.89
Mean	86.00	35.58	28.62	34.83	4.38	32.05	1137.29	5.73
SED	1.5178	0.0633	0.0200	0.0417	0.0062	0.0265	1.4361	0.0045
CD (P = 0.05)	3.3070	0.1380	0.0436	0.0910	0.0134	0.0578	3.1290	0.0099

Conclusion

This study concludes that seeds hardened with 6% panchagavya recorded higher seed quality, plant growth and yield parameters in black gram. The manifestation of seed

quality through the usage of 6% panchagavya is confirmed and it can be recommended for quality seed production in black gram.

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Conflict of Interest

There is no such conflict of interest

References

1. Srimathi P, Mariappan N, Sundaramoorthy L, Paramathma M. Efficacy of panchagavya on seed invigoration of biofuel crops. *Sci Res Essays*. 2014;8(41):2031-2037.
2. Vijayan R, Krishnasamy V. Impact of organic techniques of seed crop management on seed yield and quality in rice cv. ADT 43. *Sci Res Essays*. 2014;9(13):611-618.
3. Kaur B, Majumder K. Antinutrients in pulses. In: *Reference Module in Food Science*. Singapore: Springer; 2024. p. 1-18. doi:10.1007/978-1-0716-4272-6_14.
4. Shakuntala NM, Vasudevan SN, Patil SB, Doddagoudar SR, Macha RCMSI, Vijaykumar AG. Organic biopriming on seed vigour inducing enzymes in paddy-an alternative to inorganics. *Ecoscan*. 2012;1:251-257.
5. Sreenivasareddy A, Chaurasia AK. Effect of organic and inorganic seed treatments on plant growth and yield in mustard (*Brassica juncea* L.). *Biol Forum Int J*. 2021;13(1):196-199.
6. De Lespinay A, Lequeux H, Lambillotte B, Lutts S. Protein synthesis is differentially required for germination in *Poa pratensis* and *Trifolium repens* in the absence or presence of cadmium. *Plant Growth Regul*. 2010;61:205-214.
7. Sharma P, Sardana V, Sukhvinder SK. Dry matter partitioning and source-sink relationship as influenced by foliar sprays in groundnut. *Bioscan*. 2013;8(4):1171-1176.
8. Suchith Kumar C, Singh G. Effect of panchagavya on growth and yield: a review. *Int J Curr Microbiol App Sci*. 2020;9(12):617-624.
9. Patel DM, Patel IM, Patel BT, Singh NK, Patel CK. Effect of panchagavya and jivamrut on yield, chemical and biological properties of soil and nutrient uptake by kharif groundnut (*Arachis hypogaea* L.). *Int J Chem Stud*. 2018;6(3):804-809.
10. Vennila C, Jayanthi C. Response of okra to integrated nutrient management. *J Soils Crops*. 2008;18:36-40.