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An Economic Analysis of Seed Production as Influenced by Bioprimng in Green Gram [*Vigna radiata* (L).Wilczek]

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A B S T R A C T

The field experiment was conducted during *kharif* season, 2017 at Seed Farm, College of Agriculture, Vijayapura,Karnataka. The experiment comprised of nine biopriming treatments and control. The results revealed that the higher seed yield (790 kg ha^{-1}), gross returns (Rs. 39,475 ha^{-1}), net returns (Rs. 24,046 ha^{-1}) and B:C ratio (2.56) were recorded in the *Rhizobium leguminosarum* @ 20 per cent followed by *Trichoderma harzianum* @ 20 per cent, *Streptomyces* sp. strain AUDT-502 @ 20 per cent as compared to control and *Fluorescent pseudomonad* sp.

Introduction

Green gram [*Vigna radiata* (L.) Wilczek] is an important pulse crop belongs to the family Leguminosae**.** It is an excellent source of protein and minerals for vegetarian people of India. It is cultivated in *kharif, rabi* as well as in summer season throughout the country. The over use of plant growth regulators, pesticides and fertilizers for faster growth of agricultural produce is detrimental to human health and environment as a whole. Further, consumers are becoming conscious and critical about the quality of food and by-product that affect their health though the toxicity depends to some extent of the type of food consumed. For that organic agriculture is one of the methods to enhance seed quality of crops. Organic agriculture with organic seed includes growing of crops by a set of guidelines that prohibit the use of synthetic products/ chemicals such as fertilizers, pesticides and herbicides. Therefore, soil fertility and pest management is achieved through cropping patterns, manures biofertilizers, cultural practices and biopesticides. At present this system seems to be an ideal and valid solution to produce seeds beside with the agriculture production.

As far as importance of seed is concerned, it is the vital input for attaining sustained growth

quality organic seed production is a specialized activity that paves way for initial assurance towards realization of higher output. The general farm saved seed cannot be substituted for quality seed, as it generally lacks genetic vigour and has poor germination. A sustained increase in agricultural production and productivity depends on development of new improved varieties and adequate supply of quality seed to the farmers at the right time. It is estimated that the direct contribution of quality seed alone to the total production is about 15–20 percent depending upon the crop. Various factors influence costs and returns in greengram seed production, affect its profitability and account to different impacts on adopters of seed production as well as grain producers, which necessitates for studies regarding production economics of quality seed production and its adoption among farmers (Govind *et al.*, 2016).

Materials and Methods

The field experiment was conducted at Seed Farm, College of Agriculture, Vijayapura It is located in Northern Dry Zone of Karnataka during 2017. The experimental site was vertisol and the soil topography was fairly uniform with light slope in one direction.

The experiment comprised of 9 treatments and laid out in RCBD design with three replications. The seeds dibbled at 30 × 10 cm spacing and entire quantity of fertilizer that was 12.5:25:0 kg NPK per ha were applied as a basal dose. Routine cultural operations were attended to keep the plots free from weeds. The seed yield per hectare was weighed and expressed in kilograms per hectare. Followed by worked out gross returns, net returns and B:C ratio were recorded based on the current prices during the year of experimentation (Table 2).

Results and Discussion

The Economic analysis in green gram was significantly influenced by biopriming. The results on seed yield per hectare as influenced by presowing of biopriming seed treatments are presented in Table 1. Among the treatments, the seeds bioprimed with *Rhizobium leguminosarum* @ 20 per cent produced higher seed yield (790 kg ha^{-1}) followed by *Trichoderma harzianum* @ 20 per cent (779 kg ha^{-1}), *Streptomyces* sp. strain AUDT-502 @ 20 per cent (756 kg ha^{-1}). While, the lower seed yield per hectare was recorded with hydropriming with $CaCl_2$ @ 2 per cent (681 kg ha^{-1}) and control (667 kg ha^{-1}).

Significantly higher gross returns, net returns and B:C ratio were recorded in the *Rhizobium leguminosarum* @ 20 per cent (Rs. 39,475 ha^{-1}, Rs. 24,046 ha^{-1} and 2.56 respectively) followed by *Trichoderma harzianum* @ 20 per cent (Rs. 38,935 ha^{-1}, Rs. 23,506 ha^{-1}, 2.52 respectively), *Streptomyces* sp. strain AUDT-502 @ 20 per cent (Rs. 37,816 ha^{-1}, Rs. 22,387 ha^{-1}, 2.45 respectively) as compared to control. Whereas the cost of cultivation did not vary much except bioagents as compared to control,

The seed yield and net return may be attributed to increased seed yield and its contributing parameters. The higher gross returns, net returns and B:C ratio in *Rhizobium leguminosarum* @ 20 per cent was attributed to seed inoculation with *Rhizobium* resulted increased productivity. The increased monetary returns may be attributed to increased grain and straw yield of urdbean and has also been reported by Seema and Singh (2009). Similar results were also obtained by Khan and Prakash (2014) in urdbean.

Table.2 Price of inputs and out puts used for experiment

Sl. No.	Particulars	Quantity	Rate (₹)	Total Price
1.	**Inputs**			
A	**Seeds**	12.5 kg/ha	85/kg	1,062.5
B	T_1 *Trichodermaharzianum* @ 20 per cent T_2 *Pseudomonas fluorescens*@ 20 per cent T_3 *Fluorescent pseudomonad sp.* @ 20 per cent T_4 *Bacillus sp.* @ 20 per cent T_5 *Rhizobium leguminosarum*@ 20 per cent T_6*Streptomoces strain AUDT-248* @ 20 per cent T_7 *Streptomoces strain AUDT-502* @ 20 per cent T_8Hydropriming with $CaCl_2$ @ 2 per cent T_9 Control	3.6 l/ha 3.6 l/ha 3.6 l/ha 3.6 l/ha 3.6 l/ha 3.6 l/ha 3.6 l/ha 360 g/ha -	300/litre 300/litre 300/litre 300/litre 300/litre 300/litre 300/litre 331/500 g -	1,080 1,080 1,080 1,080 1,080 1,080 1,080 238.32 -
C	**Land preparation**			
	Tractor charges Equipment hire charges (Bullock pair)	1 plough 1 pair	2,000/ha 250/day	2,000 250
D	**Sowing**			
	Bullock pair Leveling with bullock pair	1 pair 2 harrow	1,500/day 250/day	1,500 500
E	**Fertilizers**			
	FYM Urea DAP	50 q/ha 12.5 kg/ha 25 kg/ha	100/q 6.4/kg 12.25/kg	5,000 80 306.25
F	**Hand weeding (2 times)**			
	Women labour	4 No’s	200/day	800
G	**Plant protection**			
	Regent	750 ml/ha	300/250 ml	900
H	**Harvesting and Threshing**			
	Women labour	4 No’s	200/day	800
J	**Cleaning, drying and packing**			
	Men labour Women labour	1 No’s 4 No’s	350/day 200/day	350 800

Table.1 Economics of seed production as influenced biopriming in green gram

Treatments	Seed yield (kg ha^{-1})	Gross return (Rs. ha^{-1})	Cost of cultivation (Rs. ha^{-1})	Net returns (Rs. ha^{-1})	B:C ratio
T_1 *Trichodermaharzianum* @ 20 per cent	779	38,935	15,429	23,506	2.52
T_2 *Pseudomonas fluorescens* @ 20 per cent	708	35,231	15,429	19,802	2.28
T_3 *Fluorescent pseudomonad* sp. @ 20 per cent	684	34,221	15,429	18,792	2.22
T_4 *Bacillus* sp. @ 20 per cent	716	35,810	15,429	20,381	2.32
T_5 *Rhizobium leguminosarum* @ 20 per cent	790	39,475	15,429	24,046	2.56
T_6 *Streptomoces* strain AUDT-248 @ 20 per cent	721	36,042	15,429	20,613	2.34
T_7 *Streptomoces* strain AUDT-502 @ 20 per cent	756	37,816	15,429	22,387	2.45
T_8Hydropriming with $CaCl_2$ @ 20 per cent	681	34,035	14,587	19,448	2.33
T_9 Control	667	33,341	14,349	18,992	2.32
Mean	722	36,101	-	20,885	2.37
S.Em. ±	25.82	1258	-	898.3	0.070
C.D. (P = 0.05)	77.41	3773	-	2693	0.211

Note:

T_1 *Trichoderma harzianum* @ 20 per cent,
T_2 *Pseudomonas fluorescens* @ 20 per cent
T_3 *Fluorescent pseudomonad* sp. @ 20 per cent
T_4 *Bacillus* sp. @ 20 per cent
T_5 *Rhizobium leguminosarum* @ 20 per cent
T_6 *Streptomyces* sp. strain AUDT-248 @ 20 per cent
T_7 *Streptomyces* sp. strain AUDT-502 @ 20 per cent
T_8 Hydropriming with $CaCl_2$ @ 2 per cent
T_9 Control

In conclusion, it is clear from the present study that seed biopriming significantly influences economics of seed production in green gram further revealed that the seeds bioprimed with *Rhizobium leguminosarum* @ 20 per cent produced significantly higher seed yield, gross returns, net returns and B:C ratio followed by *Trichoderma harzianum* @ 20 per cent, *Streptomyces* sp. strain AUDT-502 @ 20 per cent, while lower gross returns was recorded in control and *Florescent pseudomonad* sp.

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