



## Effect of seed treatment and different composts on the performance of Blackgram (*Vigna mungo* L.) under mid hill conditions of Himachal Pradesh

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### Abstract

A field experiment was conducted at experimental farm of Department of Organic Agriculture, CSKHPKV, Palampur during *kharif* season 2009 and 2010 to study the influence of seed treatment with Himslurry + biofertilizers and organic manures (FYM, Vermicompost-VC, Himcompost-HC, HC+VC, HC+FYM and Nadep) in blackgram (*Vigna mungo* L.). For seed treatment Him slurry and biofertilizers were used. Based on field experiments, it was found that the application of himcompost recorded higher yield attributes (pods/plant, seeds/pods, 1000-seed weight, haulms yield and seed yield) followed by HC+VC and HC+FYM. Lowest values were found in application of Nadep compost. HC when applied alone or in the combination with other composts resulted in better yield as compare to the remaining treatments.

**Keywords:** Blackgram, FYM, Himcompost, Him slurry, Nadep, and Vermicompost

### Introduction

Black gram (*Vigna mungo* L.) originated in India, where it has been in cultivation from ancient times and is one of the most highly prized pulses of India (Nitin *et al.*, 2012). Black Gram is a self fertilised crop and a rich source of protein, minerals, soluble sugars, fibers, starch and unavailable carbohydrates (Gopalan *et al.*, 1991). In H.P. it can be grown as pure or mixed crop during *kharif* season. Now a days every food category has an organic alternative. Awareness about crop quality and soil health has increased the attention of people toward organic farming (Sangeetha *et al.*, 2013; Sharma *et al.*, 2008). Balanced use of nutrients through organic sources like farmyard manure, vermicompost, green manuring, neem cake and biofertilizers are pre-requisites to sustain soil fertility, to produce maximum crop yield with optimum input level (Dahiphale *et al.*, 2003). The organic manures leave behind sufficient residual effect for the sequence crops (Singh *et al.*, 1996.). Various studies have demonstrated improvements in soil fertility using a variety of compost material (Parvaresh *et al.*, 2004;

Parthasarathi *et al.*, 2008; Ogwueleka, 2009). Farmyard manure, compost, vermicompost, green manuring, agro-wastes and plant wastes imply for sustainability of soil organic carbon (Tolanur and Badanur, 2003). Use of organic manure increases crop yield, improves crop quality and protect plant from pests and diseases have been demonstrated for a wide range of crops and under different soil conditions (Kumar *et al.* 2011). The present investigation was hypothesized to examine the effect of seed treatment and different composts on the performance, yield and yield attributes of black gram (*Vigna mungo* L).

### Materials and Methods

#### Composition of different composts used in the experiment.

**Him slurry:** Various components (Lactating Cow dung - 40 kg, Basalt powder/ bone meal-100g, egg shell (ground)- 200 g, Matka khad-10 ml, Jaggery- 50 g) were mixed properly and kept in a compost pit for a period of 60-70 days. Then 500 g of Him slurry was dissolved in 50 ml water and kept for 12 hours before spraying.

**FYM:** Farm yard manure is a mixture of animal dung, bedding material containing the urine of animal absorbed in it.

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**Vermicompost:** Vermicompost consists of remains/waste material from plants or any biomass, dung of the animals (dung and biomass in the ratio of about 50:50), improved species of vermiculture like *Eisenia foetida* or *Eudrilus eugeniae* etc.

**Him compost:** It is an enriched compost, prepared with locally available biomass, cow dung, cow urine, oil seed cake, rock phosphate, gypsum, slaked lime, bone meal, ash, egg shell etc. in the structure which is plastered with soil and dung to check the loss of nutrients and early decomposition of the biomass and dung.

**NADEP compost:** In this method of composting perforated structure is made either with bricks or locally available sticks of bamboo or any other material to make it airy. Then agricultural waste (dry or green), dung or slurry and soil from the cultivated fields are added in the ratio of 10:1:1 respectively with appropriate quantity of water.

#### **Field experiment:**

Field experiments were conducted during *kharij* seasons 2009 and 2010 at the experimental area of Department of Organic Agriculture, CSKHPKV, Palampur. The area represents mid-hill wet temperate zone of Himachal Pradesh, situated at an altitude of 1290.8 m and is bounded between 32° North latitude and 76° East longitude. The soil of the experimental area was silty clay loam in texture, acidic in reaction having pH around 5.5-5.7, organic carbon 0.65%, available nitrogen 275 kg/ha phosphorus 7.5 kg/ha and potassium 298 kg/ha. The experiment was laid out on 3<sup>rd</sup> week of June during both the years in factorial randomized block design with three replications and 12 treatment combinations. The treatments include six organic manures and combination *i.e.* Vermicompost (VC), Himcompost (HC), NADEP, Farm Yard Manure (FYM) and combination of HC+FYM, HC+VC alongwith combination of seed treatment with Himslurry and biofertilizers. The seed used for experiment was 50 % treated with Himslurry and biofertilizers (Rhizobium +PSB) and 50% was untreated. Seed treatment with slurry+biofertilizers is the right and effective method of application for getting maximum response. The seed rate used was 12-15 kg/ha and optimum spacing was 30 x 10 cm. The spray of Panchgavya for management of diseases and pests was scheduled after every 15 days till harvesting. All agronomic operations were kept normal and uniform for all the treatments.

Data collected were statistically analyzed using the CPCS.

## **Results and Discussion**

### **Effect of seed treatment:**

The yield attributes viz. pods/plant, seeds/pod and 1000-seed weight were affected significantly due to seed treatment with himslurry and biofertilizers (Rhizobium + PSB). Number of pods/plant and 1000-seed weight were significantly higher in the plots receiving the treated seed (Table 1). However, there was no significant difference in the number of seeds/pod in treated and untreated plots. Haulams yield in treated plots was 9.0 and 28.1% higher as compared to the plots receiving untreated seed during 2009 and 2010, respectively. Similarly, the seed yield was 7.5 and 29.6 % higher in treated plots during 2009 and 2010, respectively over the untreated plots however, the difference in the seed yield during 2009 was not significant.

**Effect of composts:** Different composts affected the yield attributes and yield of mash significantly during both the years of experimentation (Table 1). Number of pods/plant were significantly higher in the plots having Himcompost (HC) 5.0 t/ha as compared to other treatments. Except HC+FYM (2.5+7.5 t/ha) and HC + VC (2.5+5.0 t/ha) with which it was statistically at par during both the years of study. Vermicompost was the next best treatment in this regard. Similarly, HC 5.0 t/ha recorded significantly highest number of seeds/pod over all other treatments closely followed by VC 10.0 t/ha. The remaining treatments were statistically similar in this regard except HC+FYM (2.5+7.5 t/ha) during 2010 which being at par with VC (10.0 t/ha) resulted in significantly higher values of seeds/pod over rest of the treatments. HC (5.0 t/ha), HC+FYM (2.5+7.5 t/ha), HC+VC (2.5+5.0 t/ha) and VC (10.0 t/ha) being statistically at par with each other resulted in significantly higher values of 1000-seed weight over all other treatments which were also at par among themselves except Nadep 10.0 t/ha which recorded the lower values of 1000-seed weight during both the years. Himcompost 5 t/ha being at par with HC+FYM (2.5+7.5 t/ha), HC+VC (2.5+5.0 t/ha) resulted in significantly higher haulams yield as compared to other treatments. The next best treatment in this regard was VC 10.0 t/ha. NADEP

and FYM produced lower haulms yields as of experimentation. Himcompost 5.0 t/ha, VC 10.0 t/ha, HC+FYM (2.5+7.5 t/ha) and HC+VC (2.5 + 5.0 t/ha) being at par with each other resulted in significantly higher seed yield over other treatments. Nadep 10.0 t/ha performed poorly and produced lowest seed yield however, it was at par with FYM 15.0 t/ha during the second year of study *i.e.* 2010.

**Nutrient and microbial status:**

The liquid manures were analyzed for pH , macronutrient , organic carbon and microbial status

compared to other treatments during both the years results of which were showed that highest pH value was recorded in NADEP compost whereas, the highest percentage of NPK was recorded in Himcompost as compared to the other organic manures. The highest value of organic carbon was recorded in the FYM(Table 1 and 2).

The microbial status of the different organic manures used in the experiments revealed that the highest microbial count in respect of bacteria, fungi, actinomycetes and azotobacter was recorded in Himcompost whereas, the PSB was highest in vermicompost.

**Table 1: Average nutrient status of different organic manures used in experiment**

Organic Manures	pH	% N	% P	% K	% OC
FYM	7.0	0.62	0.40	0.50	38.34
Vermicompost	7.0	1.17	0.78	0.65	32.50
Him compost	7.3	1.62	0.86	0.89	29.19
Nadep Compost	7.6	0.81	0.37	0.35	28.90
Him Slury	6.5	1.02	0.022	0.084	5.17

**Table 2: Microbial status of different organic manures**

Treatments	Microbial count (log CFU)				
	<i>Bacteria</i>	<i>Fungi</i>	<i>Actinomycetes</i>	<i>Azotobacter</i>	PSB
FYM	6.12	1.40	4.70	ND	ND
Himcompost	7.76	5.71	8.48	6.77	5.38
Him slurry	6.51	3.36	5.41	4.91	5.50
Vermicompost	7.74	5.54	7.15	6.26	5.57

**Table 3: Effect of Composts on yield and yield attributes**

Treatments	Pods/plant		Seeds/pod		Haulms yield (q/ha)		Seed yield (q/ha)	
	2009	2010	2009	2010	2009	2010	2009	2010
Treated	54.5	44.4	5.73	5.82	67.08	53.55	12.9	10.5
Untreated	48.4	37.8	5.97	5.6	61.56	41.79	12	8.1
CD	4.2	5.3	NS	NS	5.6	5.1	NS	1.2
VC	54.7	40.2	6.37	6.10	65.0	45.12	13	9.4
HC	61.2	48.0	7.02	7.08	72.81	51	14.8	10
NADEP	34.2	29.7	5.59	5.09	52.07	40.79	9.9	7.8
HC + FYM	59.4	48.0	5.97	6.09	67.95	47.31	13.7	9.5
HC + VC	59.0	50.2	5.85	5.73	69.27	50.78	13.8	9.9
FYM	40.2	38.2	5.12	4.86	52.4	46.92	10	9.2
CD	4.6	5.9	0.52	0.61	5.9	5.5	1.1	1.0



## Conclusion

It can be concluded from the above study that the application of Himcompost (HC) recorded high yields attributes (pod's / plant, seeds / pods, haulms yield, grains yield) followed by HC + VC and HC + FYM. Lowest values of these attributes were found in NADEP compost. HC when applied alone or in better yield as compared to the remaining treatments.

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