~~RESPONSE~~EFFECTS OF VERMICOMPOST AND PSB ON THE VEGETATIVE GROWTH AND YIELD OF ONION (*Allium cepa L.*)

ABSTRACT

A field experiment was conducted during rabi season of 2020-21 at research farm R.B.S. College, Bichpuri, Agra (U.P) to study the "Response of Vermicompost and PSB on the vegetative growth and yield of onion (*Allium cepa l.*)". ~~t~~There were 7 treatment combinations in the field layout with randomized block design~~,~~ viz: T_1= 100%RDF (Control), T_2=80%RDF+PSB (5kg/ha.), T_3 =80%RDF+VC, T_4 =80%RDF+VC+PSB (5kg/ha.), T_5 =100%RDF+PSB (5kg/ha.), T_6 =100%RDF+VC (5kg/ha.) and T_7 =100%RDF+VC+ PSB (5kg/ha.). which ware replicated th~~rice~~reetimes.(What are the parameters measured?, and what method of dataanalysis was employed?) On the basis of experiment conducted that the treatment T_7i.c, application 100% RDF+VC+ PSB (5kg/ha.) was found superior among the treatments for growth and yield of onion, the maximum bulb yield (332.64 q/ha) was obtained by application of treatment T_7 100% RDF+VC+ PSB (5kg/ha.).

Keywords: Nitrogen, Phosphorus, Potassium(not mentioned in the abstract)~~,~~ Vermicompost, PSB and Onion,growth,yield

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INTRODUCTION

Onion (*Allium cepa* L.),a herbaceous biennial plant in the amaryllis family (Amaryllidaceae) grown for its edible bulb is one of the most important vegetable crop commercially grown in the world. The word "onion" is derived from Latin language mean~~s~~ing "large pearl". It probably originated from Central Asia between Turkmenistan and Afghanistan(quote your sourcereference). The crop onion is a popular vegetable and its bulb is used raw, sliced for seasoning salads, and cooked with other vegetables and meat. Onion bulbs are essential ingredients in many African sauces and dishes. The leaves, whole immature plants called 'salad onion' or leafy sprouts from germinating bulbs are used in the same way. Onion contains carbohydrates (11.0 g), fiber (0.6 g), moisture (86.8 g) and several vitamin like vitamin C (11 mg), thiamin (0.08 mg) and niacin (0.2 mg) and also some minerals like phosphorus (39 mg), calcium (27 mg), sodium (1.0 mg), iron (0.7 mg) and potassium (157 mg) per 100 g.(quote your source reference).

Amongst bio-fertilizers, PSB strains play a key role in harnessing the atmospheric phosphorus through its fixation in the roots(quote your source reference). They haveability to solubilize~~ing~~ inorganic phosphorus from insoluble compounds.P-solubilization ability of rhizosphere microorganisms is considered to be one of the most important ~~traits associated with~~ channels of plant phosphate nutrition.

Vermicompost has large particulate surface area that provides many micro sites for the microbial activity and strong retention of nutrients. Vermicompost also contains large amounts of humus substances and some of the effects of these substances on plant growth have been shown to be very similar to those of soil applied plant growth regulators or hormones(quote your source reference). As a result, most nutrients are easily available such as; nitrates, phosphates, and exchangeable calcium and soluble potassium, which are responsible for increased plant growth and crop yield(quote your source reference).State theimportance and objectives ot your studyto round upyour introductorypart.

METHODS AND MATERIALS

The field experiment was conducted at the RBS College, Agricultural Research Farm, Bichpuri (Agra), which is situated at an elevation (altitude) of 168 m above mean sea level, 27.2^0 N latitude and 77.9^0 E longitude. Bichpuri farm is located at about 11 km. away from Agra city on Agra-Bharatpur Road, in semi-arid region IV (AESR 4.1) and Agro-climatic Zone 'NWPZ' (North Western Plains Zone)

Agra enjoys semi-arid, sub-tropical climate with extremes of temperature both in winter and summer. The winter (December to January) is severe cold with minimum temperature at two degree Celsius (1-2^{0}C) and in summer (May-June) the temperature often goes up to 46^0-48^{0}C accompanied with hot desiccating winds.

The details of different treatments using in experiment are given below

T_1	100% Recommended dose of fertilizer (Control)
T_2	80% RDF+Phosphate solubilizing bacteria (5kg/ha.)
T_3	80% RDF+Vermicompost
T_4	80% RDF+VC+ PSB (5kg/ha.)
T_5	100 %RDF+PSB (5kg/ha.)
T_6	100% RDF+VC (5kg/ha.)
T_7	100% RDF+VC+ PSB (5kg/ha.)

Define allabbreviationsin thetable above.

How did you applyyour treatments?

Explain in details, your experimental procedures andmethod ofdata collection and analysis.

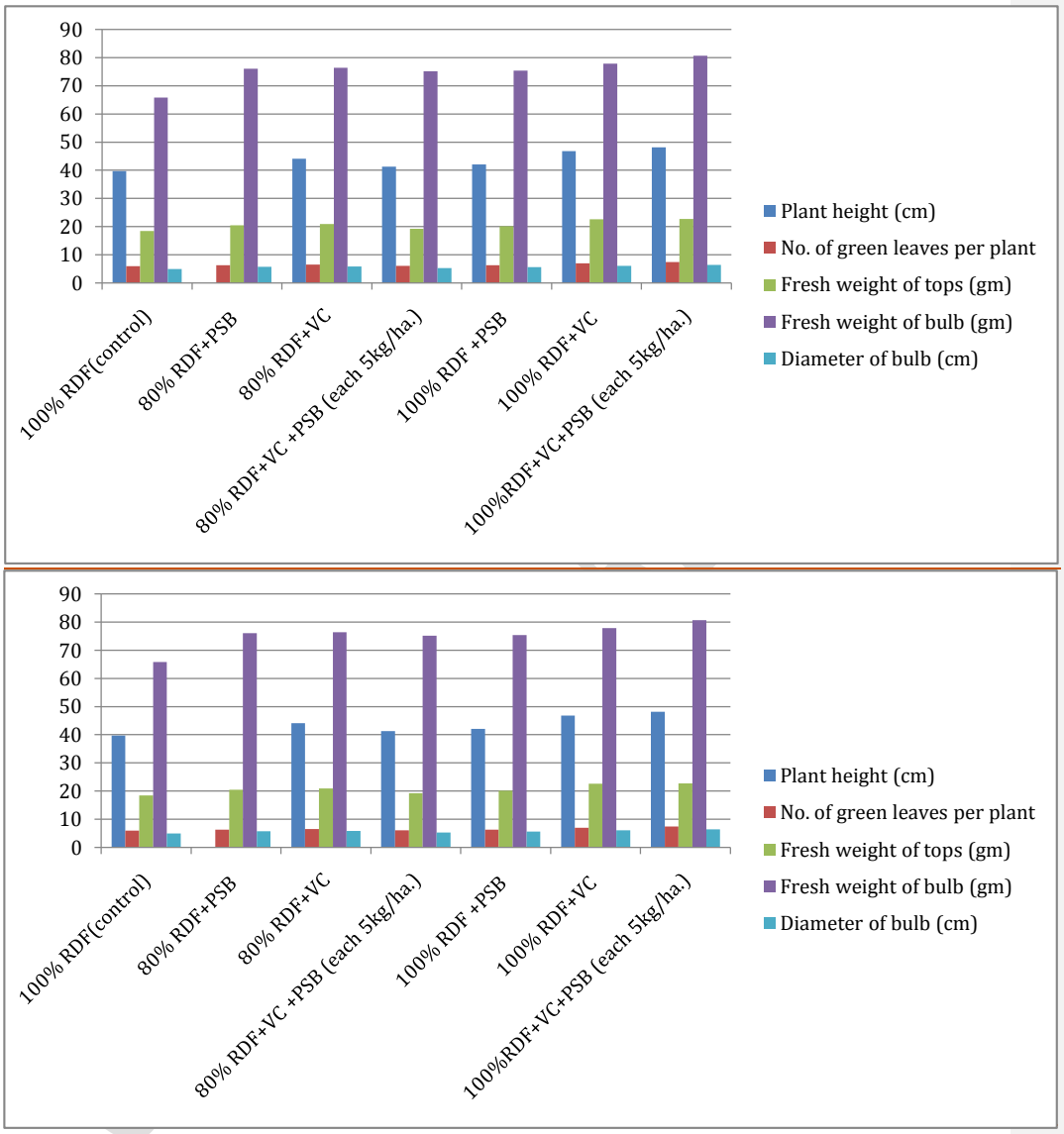
RESULTS AND DICSUSSION:

The pooled data regarding vegetative growth and yield of onion were presented in Table-1 and Table-2respectively. The datain Table-1 indicated that ~~the~~treatment T_7 (100%RDF+VC+PSB) ~~treatment~~had the maximum fresh weight of tops (22.78g~~m~~) at harvest which was significantly at par with T_6 treatment whereas minimum fresh weight of topstopes (18.43gm) was recorded ~~in~~with T_1 (100% RDF) treatment in this parameter. The data also indicated that ~~the~~T_7 (100%RDF+VC+PSB) treatment had the maximum fresh weight of bulb (80.71 g~~m~~) at harvest which was superior to all other treatments, however, treatment T_6 was statistically at par with T_7 while minimum fresh weight of bulb (65.78 gm) was obtained with T_1 (100% RDF). Diameter of bulb at harvest presented in ~~the~~Table1 showed that the treatmentT_7 (100%RDF+VC+PSB) ~~T_7~~ produced ~~(6.43cm)~~a significantly maximum diameter of bulb(6.43cm) followed by T_6 which was statistically at par to each other. However, rest of all treatments arestatistically less than T_7. The results are in agreement with the work of Yogita *et al.* (2012) and Kumar *et al.* (2010). The significantly maximum Plant height at 30,60 and 90 DAT was recorded with the treatment T_7 [100%RDF+VC+PSB (each 5kg/ha.)]. which was closely followed by T_5 and T_6 at 30,60 and 90 DAT. However the minimum plant height was noted under the treatment T_1 (100% RDF) at 30, 60 and 90 DAT. Possible reason for increased height of plant may be due to the improvement in growth related attributes because of certain growth promoting substances secreted by bio-fertilizers, better uptake of water, nutrients and their transportation. Similar studies were also conducted by ~~m~~Mandal *et. al.* (2013) and Bringh *et. al*. (2014) in onion crop. The maximum bulb yield per plot and per hectare (6.28kg and 332.64q/ha, respectively) was recorded in treatment [100%RDF+VC+PSB (each 5kg/ha.)] T_7 which was statistically at par with T_5 and T_6.Whereas, the minimum bulb yield (3.59 kg/plot) and (190.56q/ha) was obtained in T_1. This increase may be due to more number of bulbs per plot, bulb size and average weight of bulbs. Number of leaves per plant and diameter of pseudo-

stem (cm) were appreciably higher with treatment T_7 [100%RDF+VC+PSB (each 5kg/ha.)] over all other treatments. Significantly maximum diameter of Onion bulb was found in treatment T_7 [100%RDF+VC+PSB (each 5kg/ha.)] while the minimum was noted with T_1 at 90 DAT and harvest stage.

Table-1 ~~Effect of~~Fresh weight of tops (g~~m~~), Fresh weight of bulb and Diameter of bulb (cm)of Onionas influenced byvarious treatments

Treatment	Plant height (cm)	No. of green leaves per plant	Fresh weight of tops (g~~m~~)	Fresh weight of bulb (g~~m~~)	Diameter of bulb (cm)
100% RDF(control)	39.76	5.97	18.43	65.78	4.96
80% RDF+PSB	44.11=	6.32	20.45	76.03	5.76
80% RDF+VC	44.11	6.50	20.91	76.35	5.83
80% RDF+VC +PSB (each 5kg/ha.)	41.29	6.10	19.2	75.20	5.27
100% RDF +PSB	42.1	6.30	20.17	75.35	5.67
100% RDF+VC	46.82	6.93	22.6	77.83	6.09
100%RDF+VC+PSB (each 5kg/ha.)	48.14	7.40	22.78	80.71	6.43
S.Em±	**0.78**	**0.21**	**0.48**	**1.13**	**0.13**
C.D.(P=0.05)	**2.35**	**0.64**	**1.15**	**3.39**	**0.39**



90
80
70
60
50
40
30
20
10
0
100% RDF(control)
80% RDF+PSB
80% RDF+VC
80% RDF+VC +PSB (each 5kg/ha.)
100% RDF +PSB
100% RDF+VC
100%RDF+VC+PSB (each 5kg/ha.)
Plant height (cm)
No. of green leaves per plant
Fresh weight of tops (gm)
Fresh weight of bulb (gm)
Diameter of bulb (cm)

Fig. 1 Effect of Fresh weight of tops (g~~m~~), Fresh weight of bulb and Diameter of bulb (cm)(This figure is irrelevant as there was no mention ofit in the write-up. Alsodatapresented by the figureare already presented in the tables and there's no need for repetition).

Table 2- ~~Effect of~~Fresh weight of bulb (kg/plot), Dry matter content of bulb (%) and Total bulb yield (q/ha)of Onion as influenced by various treatments

Treatment	**Fresh weight of bulb (kg/plot)**	**Dry matter content of bulb (%)**	**Total bulb yield (q/ha)**
100% RDF(control)	3.59	9.78	190.56
80% RDF+PSB	4.30	10.45	228.12
80% RDF+VC	4.43	10.67	234.64
80% RDF+VC +PSB (each 5kg/ha.)	3.76	10.12	199.23
100% RDF +PSB	3.91	10.47	207.23
100% RDF+VC	5.96	10.91	315.94
100%RDF+VC+PSB (each 5kg/ha.)	6.28	11.05	332.64
S.Em+	**0.26**	**1.01**	**8.06**
C.D.(P=0.05)	**0.78**	**NS**	**24.17**

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The maximum fresh weight of bulb was obtained with the application of treatment T_7 [100%RDF+VC+PSB (each 5 kg/ha.)], which was significantly higher ~~over~~than~~all other rest of the~~ treatments. Application of treatment T_7 [100%RDF+VC+PSB (each 5kg/ha.)] gave maximum Dry matter content of bulb (8.97%) which was ~~considerably higher over rest of the treatments.~~significantly higher than all other treatments

CONCLUSION

On the basis of ~~present~~this investigation, ~~following conclusions were drawn: maximum bulb yield (332.64) Q ha^{-1} was obtained by application of treatment T_7 [100%RDF+VC+PSB (each 5kg/ha.)]. On the basis of experiment conducted,~~ it ~~is~~could be concluded that ~~the~~treatment T_7 i.e., application of [100%RDF+VC+PSB (each

5kg/ha.)] was found superior ~~among~~to all other treatments for growth and yield characters of onion in the study site. ~~maximum bulb yield (332.64) Q ha^{-1} was obtained by application of treatment T$_7$ [100%RDF+VC+PSB (each 5kg/ha.)]~~

REFERENCE

Aswani G, Paliwal R and Sarolia D K. (2005) Effect of nitrogen and biofertilizer on yield and quality of rabi onion (*Allium cepa* L.) cv. Puna Red. *Agricultural Science Digest* **25** (2):124-126

Brinjh S, Kumar S, Kumar D and Kumar M. (2014) Effect of integrated nutrient management on growth, yield and quality in onion cv. Pusa Madhvi. *Plant Archives* **14**(1): 557-559

~~**Brinjh S, Kumar S, Kumar D and Kumar M. (2014)** Effect of integrated nutrient management on growth, yield and quality in onion cv. Pusa Madhvi. *Plant Archives* **14**(1): 557-559~~

Ghanti S and Sharangi A B. (2009). Effect of biofertilizers on growth, yield and quality of onion cv. Sukhsagar. *Journal of Crop and Weed* **5**(1): 120-123

Khang V T., Patil H M and Gudedhe N N. (2019) Effect of integrated nutrient management on onion yield and soil properties in soybean-onion cropping sequence. *Omonrice* **18**: 112-120

Kumar J., Singh O and Krishan P. (2010) Response of biofertilizers and chemical fertilizers in onion (*Allium cepa* L.). *Progressive Agriculture* **10**(1): 170-172

Mandal J., Ghosh C and Chattopadhyay G N. (2013) Proportional substitution of Chemical fertilizers with Vermicompost on growth and production potential of

onion (*Allium cepa* L.). *International Journal of Bio-resource and Stress Management* **4**(2): 356-357

Rabari K V., Patel M V, Kadu S P and Umale A A. (2014) Combined effect of organic and inorganic fertilizers on growth, yield attributes, bulb yield and soil nutrient status after harvest of onion (*Allium cepa* L.). *Trends in Biosciences* **7**(23): 3861-3864

Yogita and Ram R B. (2012) Effect of chemical and biofertilizers on quality of onion. *Hort Flora Research Spectrum* **1**(4): 367-370

Yogita., Ram R B and Babu M. (2012) Effect of inorganic and biofertilizers on growth and yield of onion (*Allium cepa* L.) cv. Pusa Madhavi. *Plant Archives* **12**(2): 645-648