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# Economic aspect of vermicompost and sulphur application in the garlic cultivation

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**Abstract**
Garlic (*Allium sativum* L.) is one of the most important bulb crop grown worldwide. Due to its higher nutritive value and multipurpose uses in Indian culinary, it enjoys a special status among the spices. In recent years, vermicompost is widely advocated in integrated nutrient management. Enriched with nutrients and the nature of slow release, gives it a special status. Sulphur, on the other hand, is an important constituent of diallyl disulphide, which imparts the specific pungency to Garlic. By far the economics of the treatments is the most important consideration for making any recommendation to the farmers for its wide application.

In light of above facts, an experiment was conducted at Horticulture Farm, S.K.N. College of Agriculture, Jobner, Rajasthan. The investigation, consisted of sixteen treatment combinations with four levels of Vermicompost (Control, 2.5, 5.0 and 7.5 $tha^{-1}$) and four levels of sulphur (Control, 30, 60 and 90 $kgha^{-1}$) in Randomized Block Designs with three replications. For calculating economics, the average treatment yield along with primary market rates of the produce and costs of input were used. The result of the present investigation shows that the application of vermicompost along with sulphur increased the net returns. This result can be directly correlated with the corresponding increase in the yield of garlic. However, the highest benefit cost ratio (4.93) was obtained from the treatment having combination of Vermicompost @ 5 tons $ha^{-1}$ with Sulphur @ 90 kg $ha^{-1}$, which is due to comparatively higher return per rupee cost (5.93).

**Keywords:** Garlic, Vermicompost, Sulphur, Economics, Diallyl disulphide

## Introduction
Garlic is one of the most important as well as highly nutritive bulb crop. Although a native of Central Asia and Mediterranean region, it has succeeded to make a unique blend in Indian cuisine. Specially rich in protein, carbohydrate & ascorbic acid, it also has a good calorific value. Due to its unique flavor, it is used in preparations of number of delicacies like chutneys, pickles, curry powder, tomato ketchup etc. Beside these, Garlic is also blessed with number of medical properties owing to which it enjoys an important place among Indian system of medicine (Ayurvedic, Unani, Siddha). Galic juice & oil is recommended to inhale in case of pulmonary tuberculosis, rheumatism, sterility, impotency, cough & rednesss of eyes (Pruthi, 1979). In, India garlic cultivated throughout the country occupying an area of 0.20 million ha with production of 1.26 million tones (Anonymous, 2010). India shares a good portion of global production and ranks second in area and third in production (Anonymous, 2010). However, the productivity of this crop is quite low i.e 5 MT/ha is not quite impressive & there is a lot of scope for improvement. This scope of improvement depends upon the scientific cultivation of the crop.

As a slow releasing organic manure, vermicompost is advocated in integrated nutrient management. Helpful in reducing C: N ratio, increasing humic acid content & proving the nutrient in readily available form to plants (Talashilkar *et al*. 1999), vermicompost plays number of roles for supporting the plants nutrient requirement. It contains 2.5 percent N, 1.5 percent $P_2O_5$, 1.5 percent $K_2O$ & traces of micro-nutrient (Choudhary, 2006). On the other hand sulphur is the nutrient essential for certain amino acids, actively involved in protein synthesis & a chief constituent of diallyl disulphide, which imparts specific pungency to garlic. It is involved in the formation of chlorophyll that permits photosynthesis.

The crux of commercial importance of a crop depends upon its remunerative value fetched by the farmers. Thus the present investigation was conducted with the aim to bridge the knowledge gap and access the impact of vermicomost and sulphur upon the production economics of Garlic.

## Materials and Methods

The experiment was conducted at Horticulture farm of S.K.N. College of Agriculture, Jobner during the Rabi Season of 2010. The variety 'G-41' of Garlic was selected for the investigation. A total of 16 treatment combinations comprising of various doses of vermicompost & sulphur was applied in Randomized Block Design having three replications.

**Table 1:** Treatment Details

| Treatments | Details |
|---|---|
| **V0S0** | **Control** |
| V0S30 | Vermicompost 0 t $ha^{-1}$+Sulphur 30 Kg $ha^{-1}$ |
| VOS60 | Vermicompost 0 t $ha^{-1}$+Sulphur 60 Kg $ha^{-1}$ |
| V0S90 | Vermicompost 0 t $ha^{-1}$+Sulphur 90 Kg $ha^{-1}$ |
| V2.5S0 | Vermicompost 2.5 t $ha^{-1}$+Sulphur 0 Kg $ha^{-1}$ |
| V2.5S30 | Vermicompost 2.5 t $ha^{-1}$+Sulphur 30 Kg $ha^{-1}$ |
| V2.5S60 | Vermicompost 2.5 t $ha^{-1}$+Sulphur 60 Kg $ha^{-1}$ |
| V2.5S90 | Vermicompost 2.5 t $ha^{-1}$+Sulphur 90 Kg $ha^{-1}$ |
| V5.0S0 | Vermicompost 5.0 t $ha^{-1}$+Sulphur 0 Kg $ha^{-1}$ |
| V5.0S30 | Vermicompost 5.0 t $ha^{-1}$+Sulphur 30 Kg $ha^{-1}$ |
| V5.0S60 | Vermicompost 5.0 t $ha^{-1}$+Sulphur 60 Kg $ha^{-1}$ |
| V5.0S90 | Vermicompost 5.0 t $ha^{-1}$+Sulphur 90 Kg $ha^{-1}$ |
| V7.5S0 | Vermicompost 7.5 t $ha^{-1}$+Sulphur 0 Kg $ha^{-1}$ |
| V7.5S30 | Vermicompost 7.5 t $ha^{-1}$+Sulphur 30 Kg $ha^{-1}$ |
| V7.5S60 | Vermicompost 7.5 t $ha^{-1}$+Sulphur 60 Kg $ha^{-1}$ |
| V7.5S90 | Vermicompost 7.5 t $ha^{-1}$+Sulphur 90 Kg $ha^{-1}$ |

For calculating economics, the average treatment yield along with prevailing market rates of the produce & cost of inputs were used. Net return was calculated by substracting total cost of production from Gross Return. Additional Return is the value calculated by substracting the net return in case of control from the net return due to a particular treatment. Return per rupee cost is however the ratio of Gross return & total cost of production in case of a particular treatment.

Formula Used:

1. **Net Return=** Gross Return-Total Cost of Production
2. **Additional Return=** Net Return from a particular treatment-Net Return from control.
3. **Return per rupee cost=** Gross Return/Total Cost of production
4. **Benefit Cost Ratio=** Net Return/Total Cost of production

## Result and Discussion

A perusal of data in Table 2, Figure 1.and Figure 2., revealed that the combined effect of different levels of vermicompost and sulphur had positively influenced the net return, benefit cost ratio and return per rupee cost in case of garlic cultivation.

The maximum net return of Rs. 519799 was recorded with the treatment $V_{7.5}S_{90}$ i.e. 7.5 tones of vermicompost with 90 kg ha of sulphur per hectare. However the maximum benefit cost ratio of 4.93:1 & the maximum return per rupee cost of 5.93, was recorded with the treatment $V_{5.0}S_{90}$.

The result can be directly co-related with the corresponding increase in the yield of garlic due to vermicompost and sulphur application. The benecial effect of vermicompost on yield may be attributed to its ability to sustain availability of nutrients and balanced C: N ratio through out the growing season. Further, sulphur being an integral constituent of certain amino acids, might have helped in increasing net assimilation rate of nitrogen along with other nutrients which might have contributed in increasing the yield. The synergistic effect of vermicompost along with sulphur had succeeded in influencing the yield positively. This increase in yield increase had a direct effect on the net return, benefit cost ratio and return per rupee cost. These findings are in close conformity with the results reported by, Manohar, 2011

**Table 2:** Comparative economics of various treatments

| Treatments | Total cost of Production (Rs/ ha) | Bulb yield (q/ha) | Gross Return (Rs/ ha) | Net Return (Rs/ ha) | Additional Return (Rs/ ha) | Returnper rupee cost | B:C ratio |
|---|---|---|---|---|---|---|---|
| $V_0S_0$ | 90101 | 93.83 | 281490 | 191389 | 0 | 3.12 | 2.12:1 |
| $V_0S_{30}$ | 90851 | 125.1 | 375300 | 284449 | 93060 | 4.13 | 3.13:1 |
| $V_0S_{60}$ | 91601 | 170.37 | 511110 | 419509 | 228120 | 5.58 | 4.58:1 |
| $V_0S_{90}$ | 92351 | 173.66 | 520980 | 428629 | 237240 | 5.64 | 4.64:1 |
| $V_{2.5}S_0$ | 95101 | 120.16 | 360480 | 265379 | 73990 | 3.79 | 2.79:1 |
| $V_{2.5}S_{30}$ | 95851 | 142.39 | 427170 | 331319 | 139930 | 4.46 | 3.46:1 |
| $V_{2.5}S_{60}$ | 96601 | 163.79 | 491370 | 394769 | 203380 | 5.09 | 4.09:1 |
| $V_{2.5}S_{90}$ | 97351 | 186.83 | 560490 | 463139 | 271750 | 5.76 | 4.76:1 |
| $V_{5.0}S_0$ | 100101 | 173.66 | 520980 | 420879 | 229490 | 5.2 | 4.20:1 |
| $V_{5.0}S_{30}$ | 100851 | 189.3 | 567900 | 467049 | 275660 | 5.63 | 4.63:1 |
| $V_{5.0}S_{60}$ | 101601 | 199.18 | 597540 | 495939 | 304550 | 5.88 | 4.88:1 |
| $V_{5.0}S_{90}$ | 102351 | 202.47 | 607410 | 505059 | 313670 | 5.93 | 4.93:1 |
| $V_{7.5}S_0$ | 105101 | 181.89 | 545670 | 440569 | 249180 | 5.19 | 4.19:1 |
| $V_{7.5}S_{30}$ | 105851 | 191.77 | 575310 | 469459 | 278070 | 5.44 | 4.44:1 |
| $V_{7.5}S_{60}$ | 106601 | 207.41 | 622230 | 515629 | 324240 | 5.84 | 4.84:1 |
| $V_{7.5}S_{90}$ | 107351 | 209.05 | 627150 | 519799 | 328410 | 5.84 | 4.84:1 |

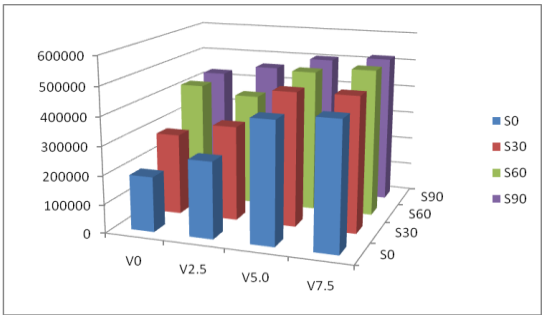


**Fig 1:** Combined effect of different Vermicompost and sulphur on net return (Rs $ha^{-1}$)

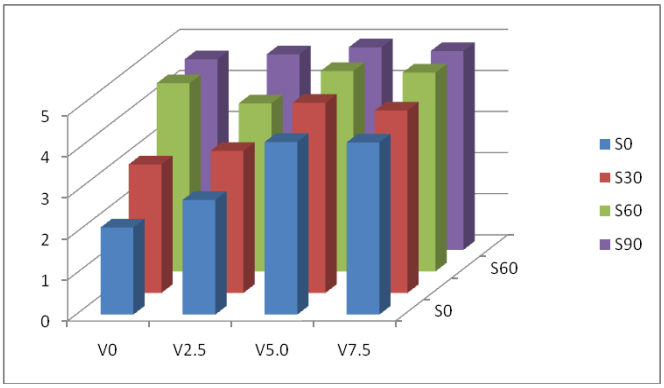


**Fig 2:** Combined effect of different Vermicompost and sulphur on benefit cost ratio.

## References

1. Anonymous. Database of 2010-11, Directorate of Economics and Statistics, Krishi Bhawan, New Delhi, 2010.
2. Choudhary, Santosh. Effect of organic and inorganic sources of nutrients on growth, yield and quality of sprouting Broccoli (Brassica oleracea L. var. italica) cv.C.B.H.-1. M.Sc. (Ag.) Tgesis, Submitted to Rajasthan Agricultural University of, Bikaner, Campus-Jobner, 2006.
3. Fisher RA, Yates F. Statistical Tables. Oliver and Boyd, Edinburgh, London, 1963.
4. Manohar SVS. Integrated nutrient management in tomato (*Lycopersicon esculentum* Mill). M.Sc. (Ag). Thesis, Submitted to S.K. Rjasthan Agricultural University, Bikaner Rajasthan, 2011.
5. Pruthi JS. Spices and condiments National Book Trust, Indian, New Delhi, 1979, 125-132.
6. Talashilkar SC, Bhangarath PP, Mehta VB. Changes in chemical properties during composting of organic residues as influenced by earthworm activity. Journal of Indian Social Soil Science. 1999; 47(1):50-53.