

Influence of organic fertilizers and sulphur levels on yield, quality and economics of Clusterbean (*Cyamopsis tetragonoloba* L. Taub.)

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ABSTRACT

A field experiment was conducted during summer season of 2008 at College farm, Navsari Agricultural University, Navsari to study the influence of organic fertilizers and sulphur levels on yield, quality and economics of clusterbean. Result of the experiment revealed that an application of Biocompost @ 5 t ha⁻¹ recorded significantly higher green pod (5325 kg ha⁻¹), straw (3137 kg ha⁻¹) yields, protein content (20.30 %), protein yield (188.68 kg ha⁻¹) with the highest net return of Rs. 19394 ha⁻¹ and BCR value of 3.57 over control. Similarly sulphur level also recorded significant effect in increasing all these yield and quality parameters. The highest green pod (6071 kg ha⁻¹), straw (3344 kg ha⁻¹) yields, protein content and protein yield (208.51 kg ha⁻¹) with net return of Rs. 24418 ha⁻¹ and BCR value of 4.89 was obtained under the application @ 50 kg ha⁻¹ followed by application of sulphur @ 25 kg ha⁻¹.

Key words : Clusterbean, Biocompost, Sulphur, Protein content, Protein yield, Economics

INTRODUCTION

Clusterbean or guar is an important self pollinated, multipurpose, relatively drought resistant and restorative leguminous vegetable crop. In India green and tender pods of clusterbean are used as a popular vegetable in many parts of the country. It is grown for feed, fodder, vegetable, green manure as well as for gum production. India leads the list of major guar producing countries of the world contributing to about 75 to 80 % in the world total production of around 7.5 lakh to 10 lakh tonnes. In India, the main states cultivating clusterbean are Rajasthan, Gujarat, Haryana, Punjab and Uttar Pradesh.

Yield in clusterbean is an integration of the effect of numerous factors on many physiological components. Looking to the soil health and to sustain the productivity, use of judicious combination of organic and inorganic fertilizer is essential. The organic manures *i.e.* FYM, castor cake, Biocompost, vermicompost, poultry manure, neem cake are well recognized, which supply necessary macro and micro plant nutrients for maintaining soil fertility. Application of sulphur not only increase the crop yield but also improves the crop quality *i.e.* it increase the oil and protein content, improves nutritional quality of fodder and improves starch content in tubers. For exploiting the potential yield of clusterbean use of organic fertilizers and sulphur application is necessary. Keeping in view the above facts the present investigation was therefore initiated to workout the response of organic and sulphur fertilizers on yield and yield attributes of clusterbean.

MATERIALS AND METHODS

A field experiment was conducted during summer season of 2008 at College Farm, Navsari Agricultural University, Navsari to study the influence of organic fertilizers and sulphur levels on yield, quality and economics of clusterbean. The soil of the experiment field was clayey in texture, low in available nitrogen (176 kg ha⁻¹), medium in available phosphorus (32 kg ha⁻¹), available sulphur (21.01 kg ha⁻¹) and fairly rich in available potassium (350 kg ha⁻¹) with 7.8 pH. Nine treatment combinations comprising three levels of organic fertilizers *viz.*, Control (F₀), FYM @ 5 t ha⁻¹ (F₁) and Biocompost @ 5 t ha⁻¹ (F₂) and three levels of sulphur *i.e.* Control (S₀), 25 kg S ha⁻¹ (S₁) and 50 kg S ha⁻¹ (S₂) were tried in factorial randomized block design with four replications. The Clusterbean variety Pusa Navbahar was sown on 29 February 2008 keeping 45 cm inter-row spacing and intra-row spacing of 15 cm was maintained by thinning operation. Recommended dose *i.e.* 20:40:00 kg NPK ha⁻¹ and other cultural practices were also adopted as per need of crop.

RESULTS AND DISCUSSION

The results obtained from the present investigation are summarized below :

Effect on pod and straw yields:

The organic fertilizers were found significant effect on pod and straw yields. The Biocompost exerted remarkable effect on green pod and straw yields. Significantly the highest green pod (5325 kg ha⁻¹) and

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Table 1: influence of organic and sulphur fertilizers on yield, quality and economics of clusterbean

Treatments	Green pod yield (kg ha ⁻¹)	Straw yield (kg ha ⁻¹)	Protein content (%)	Protein yield (kg ha ⁻¹)	Economics	
					Net Realization (Rs./ha)	BCR
A. Organic fertilizers (F)						
F ₀ = Control	4178	2577	18.68	138.43	15103	3.50
F ₁ = 5 t FYM ha ⁻¹	5098	2822	19.45	165.63	15478	2.50
F ₂ = 5 t Bio-compost ha ⁻¹	5325	3137	20.30	188.68	19394	3.57
S. E. ±	347	59.76	0.42	6.21	-	-
C.D. (P=0.05)	1013	174.44	1.23	18.14	-	-
B. Sulphur levels (S)						
S ₀ = Control	3632	2283	18.26	122.41	12346	3.04
S ₁ = 25 kg S ha ⁻¹	4897	2909	18.94	161.81	18616	4.02
S ₂ = 50 kg S ha ⁻¹	6071	3344	21.23	208.51	24418	4.89
S. E. ±	347	59.76	0.42	6.21	-	-
C.D. (P=0.05)	1013	174.44	1.23	18.14	-	-
C. Interaction						
F X S	NS	NS	NS	NS	-	-
C. V. %	14.72	7.27	7.55	13.11	-	-

NS-Non significant

straw (3137 kg ha⁻¹) yields were recorded with the application of Biocompost @ 5 t ha⁻¹ over control. This might be because of favorable effect of organic fertilizers like FYM and Biocompost in improvement of growth attributes such as plant height and dry matter accumulation. The improvement in green pod yield with the application of organics may be owing to the beneficial effect of availability of nutrient leading in green pod yield. Similar results were obtained by Meena *et al.* (2003) and Kumar *et al.* (2007). The results further reported that treatment receiving sulphur @ 50 kg ha⁻¹ produced significantly the highest green pod (6071 kg ha⁻¹) and straw (3344 kg ha⁻¹) yields over control. The bioactivities of sulphur might have played important role in improving yield attributes like pods per plant, length of pod and there by pod yield per plant ultimately increase in pod and straw yield. These findings are in online with those of Singh *et al.* (2006) and Singh and Mann (2007).

Effect on quality:

It is evident from Table 1 observed that significantly the higher protein content (20.30 %) and highest protein yield (188.68 kg ha⁻¹) were recorded with the application of Biocompost @ 5 t ha⁻¹ over control. The increase in protein content was due to favorable effect of organic fertilizers on microbial activity which resulted in higher supply to nitrogen throughout the growth period resulted in higher protein content. The highest protein yield was due to higher protein content. These results are in agreement with those reported by Pathak *et al.* (2003).

Similarly higher protein content was recorded with the application of sulphur @ 50 kg ha⁻¹ being at par with sulphur @ 25 kg ha⁻¹. Significantly highest protein yield was recorded with the application of sulphur @ 50 kg ha⁻¹ over control. Sulphur is important constituent of some amino acid molecules and therefore resulted in increase in protein content. These results corroborated the findings of Singh *et al.* (2006).

Effect on economics:

The highest net return of Rs.19394 ha⁻¹ with BCR value of 3.57 was obtained with the application of Biocompost @ 5 t ha⁻¹ followed by application of FYM @ 5 t ha⁻¹ with net return of Rs. 15478 ha⁻¹ and BCR value of 2.50. This was due to comparatively more increase in yield was obtained under Biocompost @ 5 t ha⁻¹ (5325 kg ha⁻¹) over FYM @ 5 t ha⁻¹ (5098 kg ha⁻¹). These results are in accordance with the findings of Jat *et al.* (2006) in fenugreek. Results further reported that an appreciable increase in net realization due to various levels of sulphur. The highest net return of Rs. 24418 ha⁻¹ with BCR value of 4.89 was obtained with the application of sulphur @ 50 kg ha⁻¹ followed by application of sulphur @ 25 kg ha⁻¹ which realized net return of Rs.18616 ha⁻¹ and BCR value of 4.02. This was due to comparatively better increase in yield over other treatments. These results are in accordance with the findings of Nehara *et al.* (2006) and Singh and Mann (2007).

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