

# International Journal of Innovative Research in Science, Engineering and Technology

(A Monthly, Peer Reviewed Journal, Impact Factor: 7.215)

Visit: [www.ijirset.com](http://www.ijirset.com)

Vol. 7, Issue 9, September 2018

## Effect of Organic Fertilizers on Growth and Yield of Simla Mirch

Dr. Rashmi Singh<sup>1</sup>, Dr. PK Singh<sup>2</sup>, Dr. NK Singh<sup>3</sup>

S.M.S. (Home science), Krishi Vigyan Kendra, Varanasi, India<sup>1</sup>

Senior Scientist and Head, Krishi Vigyan Kendra, Varanasi, India<sup>2</sup>

S.M.S. (Plant Protection), Krishi Vigyan Kendra, Varanasi, India<sup>3</sup>

**ABSTRACT:** Sweet bell pepper plants (Simla Mirch) were grown in a greenhouse under three different cultivation methods (organic, integrated and conventional farming). During the crop cycle, plant growth and especially yield and fruit quality parameters were monitored to determine the effects of the different fertilization strategies. Plant fresh weight and total leaf fresh weight were progressively reduced, relative to the other treatments, in the organic treatment compared with the conventional, and at the end of the crop cycle these parameters were reduced by 32.6 and 35% respectively. This reduction in growth was directly correlated with plant nitrate concentration and, at the end of the study, nitrate concentration was reduced almost completely in the organic treatment. Despite the important effect on growth, no significant differences in total marketable yield were observed between conventional and organic farming, although integrated farming showed the highest yield in the extra and first class fruit categories. Organic farming increased antioxidant activity but reduced both chlorophylls and  $\beta$ -carotene. Fruit firmness, pericarp thickness, pH and total soluble solids content showed higher values with the organic method, but these differences were not significant with respect to the conventional method. Our results show the advantages of the organic fertilization, from both environmental and economic perspectives, if proper dosage is added to the crop and the demonstrated buffer capacity of these plants, with respect to maintaining yield under nutrient depletion at later stages of development, is taken into account.

**KEYWORDS:** simla mirch, organic, fertilizers, growth, yield, environmental, economic, nutrient

### I. INTRODUCTION

Plastic house experiment was conducted during the two successive seasons of 2013/2014 and 2014/2015, at organic farm. This showed the organic production of two hybrids of sweet (bell) pepper using different sources of organic fertilizers under plastic house conditions. Five sources of organic fertilizers (quail, turkey chicken, rabbit manures and compost) as recommended dose of nitrogen for sweet pepper were investigated on vegetative growth, nutritional content, yield component and fruit quality of two hybrids of sweet pepper[1] (Bunjii red fruit and Shunghi yellow fruit). The experimental treatments were arranged in split plot design with three replicates, where two hybrids of sweet pepper treatments were adapted in the main plots while five types of organic fertilizers treatments were randomized in the subplots. Obtained results showed that using compost produced the highest values of plant height, N% of bell pepper plants, as well as the maximum early, total yield and fruit length. Applying compost and chicken manure produced the highest values of fruit weight, total soluble solid and vitamin C content of pepper fruits.

# International Journal of Innovative Research in Science, Engineering and Technology

(A Monthly, Peer Reviewed Journal, Impact Factor: 7.215)

Visit: [www.ijirset.com](http://www.ijirset.com)

Vol. 7, Issue 9, September 2018

## **best fertilizer FOR GROWING pepper plants**



Compost, chicken and turkey manure treatments gave the maximum number of leaves per plant and chlorophyll reading of pepper leaves, percent of P and K in plants, fruit diameter and number of fruits / plant. There were no significant differences among all organic fertilizer treatments in firmness of pepper fruits. Generally, Bunjii hybrid was superior in the most of tested parameters compared to Shunghi hybrid of pepper.[2]

### II. OBSERVATION

Capsicum (*Capsicum annum*) commonly known as Bell pepper or Sweet pepper or Green pepper belongs to family Solanaceae and is native to Mexico with secondary center of origin at Guatemala and Bulgaria. Sweet peppers differ from common hot peppers in size and shape of the fruits, capsaicin content and usage. The fruits are non-pungent and have been widely used in immature or green stage as vegetable for stuffing or for salads. Considered as high cash crop, it has occupied an important rank in world agriculture due to its high profit and nutritional values for human health. Sweet pepper fruits are a rich source of vitamin C, polyphenols, chlorophylls, carotenoids, sugars, magnesium, calcium, potassium, phosphorus and iron.<sup>3</sup> The environmental conditions in the mid hills of Nepal are very conducive for producing excellent quality fruits of bell pepper. [3,4]

Application of chemical fertilizers alone can supply only one or two nutrient elements to the crop. On the other hand, supplying only organic inputs can improve soil physical and biological environment but suffers from drawback of low content of plant nutrients. However, in the modern days, when agriculture is motivated not only for production, but also accounts for the sustainability of all the resources including soil for the generations to come.

# International Journal of Innovative Research in Science, Engineering and Technology

(A Monthly, Peer Reviewed Journal, Impact Factor: 7.215)

Visit: [www.ijirset.com](http://www.ijirset.com)

Vol. 7, Issue 9, September 2018

## HOW TO PRODUCE MORE PEPPERS

with optimized pruning and fertilization

PINCHOFSEEDS.COM

### Conventional Method



### Optimized Method



The use of chemical fertilizers has been many-a-times reported for degrading soil and water resources. Moreover, organic farming is both a philosophy and a system of agriculture, which avoids or largely excludes the use of synthetically produced fertilizers, pesticides and to the maximum extent possible relies upon crop rotations, crop residues, animal manures, legumes, green manures, off farm organic wastes, mineral bearing rocks and bio-fertilizers to maintain soil productivity and to supply plant nutrients and biological means to control insects, weeds and other pests. Thus, study was carried out in order to find the effect of various sources of plant nutrients on growth, development and yield of sweet pepper and to compare the nutrient value of various sources of organic manure used in production of sweet pepper.

# International Journal of Innovative Research in Science, Engineering and Technology

(A Monthly, Peer Reviewed Journal, Impact Factor: 7.215)

Visit: [www.ijirset.com](http://www.ijirset.com)

Vol. 7, Issue 9, September 2018

## III. DISCUSSION

### Days to first flowering

Days to first flowering was significantly accelerated by poultry manure and vermicompost, which was significantly rapid than the other treatments. This is a profound phenomenon exhibited for a longer indeterminant reproductive growth which ultimately aids to the overall fresh pepper yield. Moreover, FYM produced the flowers significantly earlier than that by commercial organic fertilizer and control, both of which were better than chemical fertilizer. Chemical fertilizers tend to provide the plant nutrients readily and encourage vegetative growth, thereby, delaying the flowering phenomenon in sweet pepper.[5,6]





## International Journal of Innovative Research in Science, Engineering and Technology

(A Monthly, Peer Reviewed Journal, Impact Factor: 7.215)

Visit: [www.ijirset.com](http://www.ijirset.com)

Vol. 7, Issue 9, September 2018

### Days to first harvest

The result of the experiment for the days to first harvest did not follow the exact trends of the days to first flowering. Use of poultry manure and vermicompost resulted in similar days to first harvest, which were significantly earlier than rest of the treatments, except that resulting from use of FYM. FYM, however, was found to be similar to control and goat manure in its influence in the days to first harvest, but was significantly early than chemical fertilizer and commercial organic fertilizer.

### Plant height

Application of various manures and fertilizers showed varied influence on the final attainable plant height. Plant height obtained from application of poultry manure and vermicompost were similar, both of which were significantly taller than the ones produced by other treatment. All the other treatment produced plant height similar to each other.



### Stem diameter

Poultry manure produced the largest stem diameter, which was significantly larger than rest of the treatment except that of vermicompost. Vermicompost, however, was at par with both poultry manure and FYM, but significantly robust

## International Journal of Innovative Research in Science, Engineering and Technology

(A Monthly, Peer Reviewed Journal, Impact Factor: 7.215)

Visit: [www.ijirset.com](http://www.ijirset.com)

Vol. 7, Issue 9, September 2018

than the other treatments. The overall stem diameter and other vegetative features gained by the use of organic sources of plant nutrients thereby, can be correlated to higher dry matter accumulation as compared to tall succulent plants resulting due to use of chemical sources.

### Number of branches

Vermicompost produced the significantly higher number of branches than the other treatments except poultry manure. Further, poultry manure was superior to all other treatments but was at par with goat manure, which was found to be superior than control in producing branches. Control was found to be at par with chemical fertilizer, FYM and commercial organic fertilizer.

### Average fruit weight

Vermicompost produced the significantly heavier fruits than the other treatments except poultry manure. Further, poultry manure was superior to all other treatments but was at par with FYM. FYM proved to be superior in terms of fruit weight than chemical fertilizer and commercial organic fertilizer, but similar to goat manure. Moreover, goat manure, chemical and organic fertilizers were similar among each other, but superior to control [7,8]



## International Journal of Innovative Research in Science, Engineering and Technology

(A Monthly, Peer Reviewed Journal, Impact Factor: 7.215)

Visit: [www.ijirset.com](http://www.ijirset.com)

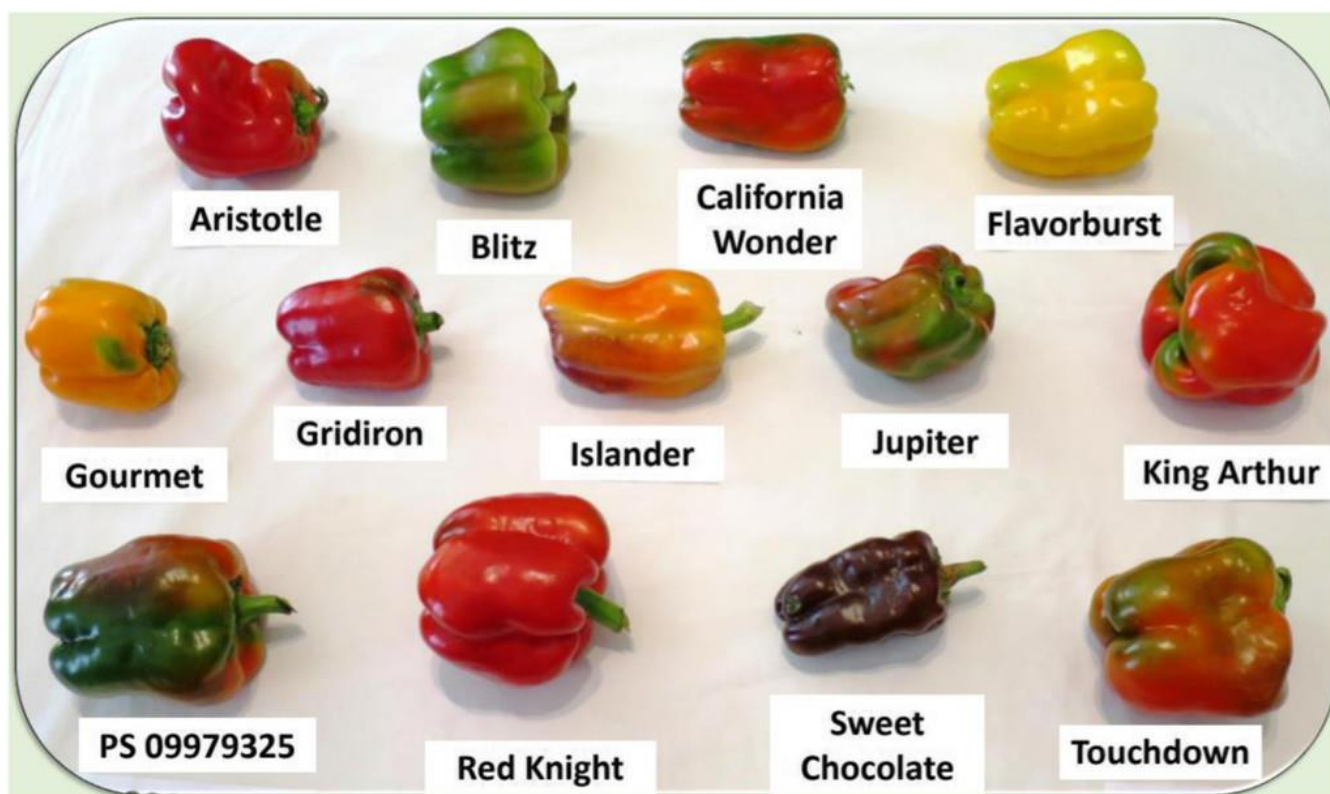
Vol. 7, Issue 9, September 2018

### SPAD

SPAD reading is considered to be highly correlated to the chlorophyll content of the leaves. SPAD reading was most prominent in chemical fertilizer, which was superior to all the treatments except vermicompost.

### Yield per plant

Use of vermicompost and poultry manure showed superior yielding caliber in sweet pepper producing yield superior than control and commercial organic fertilizer. The other treatments however were similar to each other in their yielding capacity.



Chemical fertilizers tend to provide the plant nutrients readily and encourage vegetative growth, thereby, delaying the flowering phenomenon in sweet pepper. Moreover, use of bulky organic manures accelerated the flowering than commercial organic fertilizer, chemical fertilizer and control was also reported by researchers suggesting the phenomenon to be developed by the increased temperature in the rhizosphere due to decomposition of those substrates.

Positive response of vermi-compost in different growth parameters of sweet pepper is due to fact that it increases the microbial population and also provides the source of energy to sustain them and remain active. It increases the plant growth and yield by providing nutrients in the available form as compared to other organic manures and conventional inorganic fertilizers. Vermi-compost retains nutrients for long time while the conventional compost fails to deliver the required amount of macro and micronutrient including the vital NPK to plants in shorter time. It was reported that the

# International Journal of Innovative Research in Science, Engineering and Technology

(A Monthly, Peer Reviewed Journal, Impact Factor: 7.215)

Visit: [www.ijirset.com](http://www.ijirset.com)

Vol. 7, Issue 9, September 2018

vermin-compost is proving to be highly nutritive organic fertilizer and more powerful growth promoter over the conventional composts. The Vermi composting accelerates the rate of decomposition of the organic matter, alters the physical and chemical properties of the material, and lowers the C: N ratio, leading to a rapid humification process in which the unstable organic matter is fully oxidized. Application of vermin-compost to soils increased their microbial biomass and dehydrogenase activity. This increase in microbial mass and dehydrogenase activity helps in nitrogen fixation and increase the availability to the crop and boost up the growth and development. It has been reported it improves soil structure or tilt and increases its water holding capacity.[9,10]

## IV. CONCLUSION

The experiment showed that the use of vermicompost was better for sweet pepper growth and development as compared to other organic manures and chemical fertilizers used in the experiment. The use of commercially available organic fertilizer was seen to be a poor choice. The use of other organic manures and chemical fertilizer were similar concerning the growth and yield of sweet pepper. The use of high cost-chemical fertilizer can be readily substituted by farm-produced organic sources of plant nutrients and thus aid in sustainable and efficient resource use. However, it is important to note the better results of vermi-compost as the source of organic manure in sweet pepper.[11]

## REFERENCES

1. Safford WE. Our heritage from the American Indians. *Journal of the Illinois State Archaeological Society*. 1926;4(1):405–410.
2. Flores P, Hellin P, Fenoll J. Effect of manure and mineral fertilization on pepper nutritional quality. *Journal of Science, Food and Agriculture*. 2009;89(9):1581–1586.
3. Jadcak D, Grzeszczuk M, Kosecka D. Quality characteristics and content of mineral compounds in fruit of some cultivars of sweet pepper (*Capsicum annuum*L.). *J Elementol*. 2010;15(3):509–515.
4. Bhattarai DR. What is capsicum? *Bikash Today*. Gramin Bikash Media, Kathmandu, Nepal; 2010.
5. Stockdale EA, Lampkin NH, Hovi M, et al. Agronomic and environmental implications of organic farming systems. *Advances in Agronomy*. 2001;70:260–306.
6. Abu-Zahra TR. Vegetative, flowering and yield of sweet pepper as influenced by agricultural practices. *Middle East Journal of Science Research*. 2012;11(9):1220–1225.
7. Ghimire S, Shakya SM, Shrivastava A. Sweet pepper production using different nitrogen sources in subtropical climate. *Journal of Agriculture and Food Science*. 2013;1(1):6–10.
8. Euras A. Vermi culture can promote sustainable agriculture and completely replace chemical agriculture: Some experimental evidences by studies on potted and farmed cereal and vegetable crop. *Journal of Agriculture and Environmental Science*. 2009;5(5):1–55.
9. Albanell E, Plaixats J, Cabrero T. Chemical changes during vermicomposting (*Eisenia fetida*) of sheep manure mixed with cotton industrial wastes. *Biology and Fertility of Soils*. 1988;6(3):266–269.
10. Arancon NQ, Edwards CA, Bierman P, et al. Effects of vermin-composts on growth and marketable fruits of field-grown tomatoes, peppers and strawberries. *Pedobiologia*. 2003;47:731–735.
11. Rosen CJ, Bierman PM. Using manure and compost as nutrient source for fruit and vegetable crops. *Department of soil, water and climate*. USA: University of Minnesota; 2005.





ISSN(Online): 2319-8753  
ISSN (Print) : 2347-6710

# **International Journal of Innovative Research in Science, Engineering and Technology**

*(A Monthly, Peer Reviewed Journal, Impact Factor: 7.215)*

**Visit: [www.ijirset.com](http://www.ijirset.com)**

**Vol. 7, Issue 9, September 2018**