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Impact of Organic Manures and Biofertilizers on Growth, Yield and Quality of Tomato

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SUMMARY

The tomato is an important vegetable crop, both fresh and processed for human nutrition worldwide and plays a significant role in agriculture. Especially in the agricultural system where chemical fertilizers are not used. Tomato is one of the popular vegetable of great commercial value and is used in various forms. The application of organic manure and biofertilizers had significantly increased the growth of tomato. Generally solanaceous vegetables requires large quantity of major nutrients like Nitrogen, Phosphorous and Potassium, in addition to secondary nutrients such as Calcium and Sulphur for better growth, yield and quality. The cost of chemical fertilizers has been enormously increasing to an extent that they are out of reach for the small and marginal farmers. It has become impractical to apply such costly inputs for a crop of marginal returns. Therefore the use of organic manure and biofertilizer in such situation is practically paying proposal for the growth, yield as well as productivity of crop.

INTRODUCTION

Tomato (*Lycopersicon esculentum* Mill.) belongs to family solanaceae having chromosome number (2n=24). It is a self-pollinated crop and Peru-Equador region is considered to be the centre of origin. Tomato was introduced by the Portuguese. Tomato is cultivated in tropics and subtropics of the world and it is being cultivated in kitchen gardens, commercial fields under green house and polyhouse conditions and soil less culture or hydroponic systems. Tomato is one of the popular vegetables of great commercial value and is used in various forms of salad, soup, ketchup, sauce, chutney, pickles, powder, paste, juice, puree, whole canned fruits and also forms an important ingredient in the cocktails known as “Bloody Mary”. It is believed that consumption of one tomato per day enhances the health status of individuals and considered to be important in diet as it is quite high in nutritive value. It contains higher quantity of total sugar (2.5- 4.5%), starch (0.6- 1.2 %) and minerals like potassium, calcium, sodium, magnesium, phosphorus, boron, manganese, zinc, copper, iron, etc. Apart from these, it also contains organic acids such as citric, malic and acetic acids which are known as health acids in fresh tomato fruit.

The flavour of tomato fruits is controlled by various volatile compounds like ethanol and acetaldehyde. Tomato juice promotes gastric secretion, acts as a blood purifier and works as intestinal antiseptic. Organic farming is a production system which avoids or largely excludes the use of synthetically produced fertilizers, pesticides, growth regulators and livestock feed additives. To the maximum extent, possible organic farming system rely upon crop rotations, crop residues, animal manures, legumes, green manures, off farm organic wastes, mineral bearing rocks and biofertilizers to maintain soil productivity and to supply plant nutrients and biological means to control insects, weeds and pests. Organic farming is both a philosophy and a system of agriculture. The prices of chemical fertilizer have gone up tremendously and the marginal farmers cannot afford such costly fertilizers. About 50 per cent of applied inorganic fertilizers are lost either through leaching or volatilization.

Under this situation use of organic manures and biofertilizers could be the key to sustain soil fertility and obtained the desired level of yield and quality. Organic fertilizers positively affected and also improve keeping quality at room temperature and in storage of vegetable (Vogtmann *et al.*, 1993). Biofertilizers are natural fertilizers containing carried based micro-organisms which help to enhance productivity by biological nitrogen fixation or solubilisation of phosphate or producing hormones, vitamins and other growth factors required for plant growth (Bhattacharya *et al.*, 2000). Based on these background the effect of organic manures and bioferilizers on growth, yield and quality of tomato are as follows.

Effect of Organic manures (FYM + Vermicompost) on growth, Yield and Quality of Tomato

The reason for increased fruit weight and fruit yield by the application of NPK with FYM and vermicompost was attributed to solubilisation effect of plant nutrients by the addition of FYM and vermicompost leading to increased uptake of NPK as reported by Sendur *et al.* (1998) summarized that application of organic

manures (FYM, vermicompost) combined with recommended dose of inorganic fertilizers showed superior performance in respect of growth, fruit yield and quality parameters in tomato.

Rajyalaxmi P. *et al*., (2015) revealed that the application of 50% RDF (150:100:50 kg/ha NPK) + 50% FYM resulted in maximum plant height, yield and TSS whereas juiciness, Acidity, Ascorbic acid content and maximum shelf life.

Effect of Biofertilizers on growth, Yield and Quality of Tomato

The importance of adding bio fertilizers in tomato crop, increased the availability of nutrients considerably resulting in positive effect on growth of tomato. It also helps to increase plant height may be due to increased uptake of primary nutrients, which might have enhance the cell division and cell elongation. The induction of early flowering in tomato was due to better nutritional status of the plants. Increased production of leaves might have helped to elaborate more photosynthetic and induced flowering, thus effecting early initiation of flower bud. The increase in the tomato yield may also be attributed to the higher absorption of NPK which might have favourably affected the chlorophyll content of leaves resulting increased synthesis of carbohydrates and build-up of new cells.

The important fruit quality parameters in tomato such as pericarp thickness, TSS, acidity. Ascorbic acid, lycopene were found to be better in the treatment organic manures with combination of biofertilizers. Application of RDF (60:50:30 kg NPK/ ha) + biofertilizer (Azospirillum and P solubilizing bacteria 2.5 kg/ ha each) gives better results in plant height, no of fruits, yield, fruit weight and higher germination (Jagdeesha V., 2008).

CONCLUSION

The importance of organic manures with combination of biofertilizers is, now-a-days realized because of high cost of chemical fertilizers and their inherent capacity to supply most essential nutrients for a balanced nutrition to the tomato growth. Organic nutrients generally facilitate crop rooting, improve water retention capacity and results in the even distribution of nutrients in soil profile. The biofertilizers application along with organic manures excelled in all the growth, fruit yield and quality of tomato crop.

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