



## Effect of tobacco waste on the enhanced productivity of tomato plants

G. Melchias<sup>1</sup>, P. Saravanan<sup>2</sup>, S. Sathish Kumar<sup>1\*</sup> and M. Elizabeth<sup>1</sup>

1, Department of Botany, St. Joseph's College (Autonomous), Trichy, (TN) - India

2, Department of Biotechnology, St. Joseph's College (Autonomous), Trichy, (TN) - India

### Abstract

The growth of tomato plants in three kinds of treatments along with the standard control was measured. The different treatments were of standard chemical spray, tobacco waste and neem waste at an interval of 15 days. The parameters considered for the study were survival percentage, fresh biomass and yield. The tobacco and neem waste utilization was found to be more economical with the tobacco waste treatment having maximum effects resulting in an average survival of 96.32%. The maximum fresh biomass was also noted to be 249 g/plant and the yield was found to be 0.49 T/ha. Our results demonstrate that, amongst all the three kinds of treatments that we used, use of tobacco promote better productivity of tomato plants.

Key-Words: Tobacco, Tomato, Neem, Biomass, Insecticide, Fungicide, Enhanced production

### Introduction

Tomato (*Solanum lycopersicum* L.) is one of the very important fruits that are being largely grown in India and used as a vegetable. It is a fruit rich in Vitamin C & Malic acid and is used mainly in South India in every form of curry. Unfortunately, it is attacked by a variety of diseases as well as various insect pests' right from the stage of seeding up to the time of harvest. This makes it mandatory to protect the plant from such occurrences [5]. In various District of Tamilnadu, it has been noticed that more than 24.33% tomato crops die of rotting even after the application of the recommended plant fortification procedures. Leaves of the tomato plants plummet off within a month of transplantation even after using the fungicides and insecticides. Root, seed and soil treatments were also done as not compulsory but the procedure was found poor.

India is the fourth largest producer and eighth largest exporter of tobacco in the world [3]. In Northern and Southern India, people use tobacco in various forms. The center rib of the leaves and leaf dust goes waste which is basically frightened away. This waste accounts for around 15% of the total production of tobacco which may not be better safe.

This tobacco waste was used for the better manufacture of tomato plants. In the present study, five laboratory trials were conducted by bringing the soil specimens from five different places in Thane district of Maharashtra state to see the preliminary impact and the results were found significant with the positive impacts on its survival, growth and yield.

### Tobacco waste

The tobacco stalks/ straw and leaves dust contains 1.12 and 1.10% N; 0.84 and 0.31% P<sub>2</sub>O<sub>5</sub>; 0.80 and 0.93% K<sub>2</sub>O respectively and added humus in the soil [1]. It adds to the nutrient content along with the increase in the fertility in the soil to help in growth and yield of the crop. It also restricts the insects and pests that attack the crops [2].

The main constituents of tobacco are nicotine (C<sub>10</sub>H<sub>14</sub>N<sub>2</sub>) and nornicotine (C<sub>9</sub>H<sub>12</sub>N<sub>2</sub>). It also contains the nicotine derivatives, pyridine compounds, resins, essential oils, phenol, methyl alcohol, acetone, formic acid, etc. Tobacco was primarily used as an insecticide. Nicotine in the form of sulfate has insecticidal properties.

### Neem cake

Neem cake is used as organic nitrogenous fertilizer. It adds phosphoric acid, potash and largely organic matter. Soil is added with 5.2- 5.6% N; 1.1 P<sub>2</sub>O<sub>5</sub> and 0.5% K<sub>2</sub>O [1]. It controls the pests and insects covering a broad spectrum of around 200 insect pest species belonging to different orders [2]. Neem is reported to be anti- feed ant, attractant, repellent,

### \* Corresponding Author

E.mail: sarwan1971@yahoo.co.in,  
svsathishkumar105@yahoo.com

insecticide, nematicide, growth disruptor and anti-microbial [4].

### Material and Methods

The experiment was conducted in a simple randomized block design. There were three different treatments and a control and replicated five times in the soil samples collected from the five different places. The size of each growing section was measured to be 0.25 m X 0.25 m. All the agronomical operations were adopted as and when required to raise a good crop except for the spraying of insecticides, fungicides, seed, root and soil treatment, which was only given in the chemical treatment plot. The local tomato variety was chosen as it as famous variety opted by the local people.

In the first treatment, the standard chemical spray and seed, root and soil treatment were applied as recommended in the guidelines. In the second treatment, tobacco waste were soaked in the water overnight and sprinkled over the plants and administered in the root region of the plant of the treated section each after 15 days.

In the third treatment, the neem cake was soaked overnight in the water and administered in the root region of the treated plot each after 15 days with control without insecticides, pesticides, and seed, root and soil treatments. The survival, growth and yield were recorded to see changes in between the three treatments over the control.

### Results and Discussion

The results revealed that the use of tobacco waste for the survival, growth and yield of the tomato plants were found significant in all the five trials conducted in the laboratory over the two other treatments and the control.

#### Survival

It has been observed from the experiment that the treatments were having significant effect on the survival of the tomato plants over the control (Table 1). The tobacco waste treatment has maximum effects resulting into an average survival of 96.32% while in case of neem cake treatment, the survival of the plant has been found only 74.95% which is less than the standard chemical treatment having 70.14% over the 65.84% in control.

This shows that the tobacco and neem utilization is more economical in saving the tomato plants whereas saving the tomato plants by the chemical treatment causes environmental hazards and is also not very economical. The above conclusion were in support with the conventional methods of disease management, fortification, exclusion along with practices like the use of plant bio- products or waste for the insect pests and diseases protection.

### Fresh Biomass

The fresh biomass of the tomato plant was found to be 249 g/plant in tobacco waste treatment, 237 g/plant in neem treatment, 228 g/plant in chemical treatment over the control of 214 g/plant (Table 1).

It has also been observed that the experiments proved that the tobacco waste and neem could add more nutrients into the soil and resulted in the increased fresh biomass by 6.98% and 2.59% respectively in comparison to the chemical treatment biomass and over the control by 10.87% and 6.74% respectively. Further, the tobacco waste added more nutrients in to the soil than the neem. Hence, the fresh biomass gained by tobacco waste was found to be 4.8% more over the neem.

### Yield

The tomato plant showed yields of 0.52 T/ha, 0.46 T/ha, 0.49 T/ha in the tobacco waste, neem and chemical treatments over the control of 0.40 T/ha (Table 1). The yield gain was found to be 38.36%, 31.87% and 19.23% more by the tomato plants treated with tobacco waste followed by neem and chemicals over the control.

Experiments showed that the tobacco waste treatment proved to be more beneficial in improving the crop yield over the control and other two treatments. We also find that tobacco waste is not only useful as an insecticide but also supplies the nutrients required for the plant growth.

### Conclusion

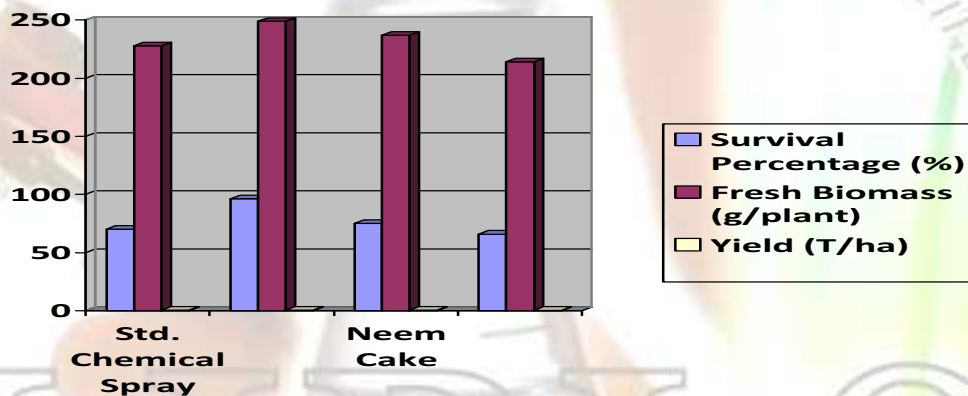
The tobacco waste treatment and neem cake had a high impact in saving tomato plant as compared to the chemical handling over the have power over. The submission of tobacco fritter away and neem lump was found to be eco- welcoming and reasonably priced. Tobacco dissipate might be ready to lend a hand in supplying certain essential nutrients to the soil which might cause an end to the ever increasing demand for the chemical fertilizers.

### References

1. Joseph, P. J., 1980. Handbook of Agriculture, *Indian Council of Agricultural Research, New Delhi.*
2. Kumar, N., 2011. Use of tobacco waste for the betterment of brinjal crop. *Recent Advances in Water Pollution Research.* 191- 195.
3. Rao, T. D. Prasada, 1992. Scope for enhanced quality. *The Hindu Survey of Indian Agriculture.* 83- 85.
4. Suri, S. K. and Mehrotra, A., 1994. *Neem A Wonder Tree.* Soc. of Forest & Env. Managers, Dehradun, India.
5. [www.growyourtomatoes.com/diseases.html](http://www.growyourtomatoes.com/diseases.html)

Table 1: Effect of different treatments on survival, fresh biomass and yield of tomato (*Solanum lycopersicum* L.) plants

Parameters	Treatment 1	Treatment 2	Treatment 3	Control
	<i>Std. Chemical Spray</i>	<i>Tobacco Waste</i>	<i>Neem Cake</i>	
Survival Percentage (%)	70.14	96.32	74.95	65.84
Fresh Biomass (g/plant)	228	249	237	214
Yield (T/ha)	0.49	0.52	0.46	0.40



Graph 1: Effect of treatment of various parameters