



## EFFECT OF ORGANIC MANURES ALONG WITH HUMIC ACID ON GROWTH AND LEAF YIELD OF THUDHIVALAI (*Solanum Trilobatum* L.) IN THE COASTAL ECOSYSTEM OF CAUVERY DELTA REGION

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### ARTICLE INFO

#### Article History:

Received 15<sup>th</sup> April, 2016  
Received in revised form  
29<sup>th</sup> May, 2016  
Accepted 17<sup>th</sup> June, 2016  
Published online 26<sup>th</sup> July, 2016

#### Key Words:

Vermicompost, Coirpith Compost,  
Humic Acid.

### ABSTRACT

“An investigation was carried out to study the “Effect of organic manures along with Humic acid on growth and yield of Thuduvalai was carried out with four different organic manures such as Farm yard manure @ 15, 17.5 and 20 t ha<sup>-1</sup>, vermicompost @ 2.5, 2.75 and 3 t ha<sup>-1</sup>, Coir pith compost @ 2.5, 2.75 and 3 t ha<sup>-1</sup> t ha<sup>-1</sup>, Poultry manure @ 2.5, 2.75 and 3 t ha<sup>-1</sup> along with Humic acid @ 0.1, 0.2, 0.3 per cent as foliar spray were studied under in randomized block design with three replication of 13 treatments. The growth parameters viz., plant height, number of branches, number of leaves, leaf area, leaf yield parameters, dry matter production and chlorophyll content were registered to be the highest when the Vermicompost (3 t ha<sup>-1</sup>) + Humic acid @ 0.3 per cent were sprayed. Among the treatments, application of Vermicompost (3 t ha<sup>-1</sup>) along in addition with Humic acid @ 0.3 per cent were found to be the best in increasing the plant growth and leaf yield attributes.

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Citation: Sendhilnathan, R., Suresh, V., Sureshkumar, R. and Rajkumar, M. 2016. “Effect of organic manures along with Humic acid on growth and leaf yield of Thuduvalai (*solanum trilobatum* L.) in the coastal ecosystem of Cauvery delta region”, *International Journal of Current Research*, 08, (07), 35502-35504.

## INTRODUCTION

Thuduvalai (*Solanum trilobatum* L.) belongs to the family Solanaceae. In this crop have a thorny creeper with bluish violet flower, mostly grown in tropical areas which commonly available in southern India and it has been used traditional in siddha system of medicine (Mohanani et al., 1996). The leaves contain rich amount of calcium, iron, phosphorous, carbohydrates, protein, fat, crude fiber and minerals. The active principle in this herb is solasodine, diosgenin, sobatum, solaine and tomatidine. This plant is recommended for use as cardiac, tonic, carminative, asthma, cough, anti-ulcerogenic activity, antibacterial, antibiotic, anticancer activity and hepatoprotective activity. Continuous use of inorganic fertilizers has resulted in ecological imbalance with consequent ill effects to the soil. Increase in cost of fertilizers, world wide energy crisis, rapid exhaustion of non renewable energy sources, increase in pollution due to chemicals and low purchasing power of farmers restrict use of fertilizers alone as a input for increasing crop production. Under such a condition, it has become imperative to use all the available sources of plant nutrients in a judicious way to minimize fertilizer use and at the same time to sustain soil fertility and crop productivity on a long term basis. In light of these facts, a study was conducted to find out the integrated nutrient management for growth and yield of Thuduvalai.

A combination of inorganic fertilizer, organic manures and foliar spray of humic acid is studied with a view to study the effect of nutrients in manures and fertilizers on the growth and yield of Thuduvalai.

## MATERIALS AND METHODS

Field experiments were conducted at medicinal plants unit, department of horticulture, Faculty of agriculture, Annamalai university, Annamalai Nagar, Cuddalore district, TamilNadu. The experiments were laid out in a randomized block design with thirteen treatments replicated thrice. The data were subjected to statistical analysis as suggested by Panse and Sukhatme, 1985. The treatment schedule was presented in Table 1.

**Preparation of field:** The experimental plot was thoroughly ploughed and the clods were crushed, weeds were removed later than bunds and channels were prepared. Thirty nine plots are formed with a plot size of 1.30 x 1.90 m were formed. Uniform and healthy seedlings were transplanted at a spacing of 45 cm x 45 cm to the main field at various organic and inorganic levels.

**Application of nutrients:** The recommended dose of inorganic nutrients were applied in the form of nitrogen was applied as urea, phosphorus was applied as a single super phosphate, while potassium was applied as muriate of potash. half dose of nitrogen, full dose of phosphorus and potassium

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were applied in 90 days after planting. As per the treatment application of organic manures viz., Farmyard manure, vermicompost, coirpith compost and poultry manure were applied before planting. The required quantity of Humic acid were taken, dissolve in water and given as foliar application as per the treatment. This foliar spray was given at 60, 90 and 120 days after transplanting. Plants were irrigated whenever necessary.

**Biometric observation:** Five plants are randomly selected from each plot were tagged for the purpose of recording observations on growth and yield parameters. Data of three replications were averaged and recorded.

## RESULTS AND DISCUSSION

**Growth parameters:** Growth is one of the essential parameters which determine the yield attributes in any crop. The results of the present investigation revealed that significant differences were recorded on the growth parameters viz., plant height, number of branches, number of leaves and leaf area. It can be inferred from the data tabulated in table 2 that there were significant differences among the various treatment with regard to growth parameters. The increase in growth parameters due to application of Vermicompost may be due to the presence of growth substance, nitrogen fixers other

**Table 1. Treatments details with their symbol**

S. no	Treatments	symbol
1	Farm yard Manure (15 t ha <sup>-1</sup> ) + Humic Acid @ 0.1% foliar spray	T <sub>1</sub>
2	Farm yard Manure (20 t ha <sup>-1</sup> ) + Humic Acid @ 0.2% foliar spray	T <sub>2</sub>
3	Farm yard Manure (25 t ha <sup>-1</sup> ) + Humic Acid @ 0.3% foliar spray	T <sub>3</sub>
4	Vermicompost (2.5 t ha <sup>-1</sup> ) + Humic Acid @ 0.1% foliar spray	T <sub>4</sub>
5	Vermicompost (2.75 t ha <sup>-1</sup> ) + Humic Acid @ 0.2% foliar spray	T <sub>5</sub>
6	Vermicompost (3 t ha <sup>-1</sup> ) + Humic Acid @ 0.3% foliar spray	T <sub>6</sub>
7	Coirpith compost (2.5 t ha <sup>-1</sup> ) + Humic Acid @ 0.1% foliar spray	T <sub>7</sub>
8	Coirpith compost (2.75 t ha <sup>-1</sup> ) + Humic Acid @ 0.2% foliar spray	T <sub>8</sub>
9	Coirpith compost (3 t ha <sup>-1</sup> ) + Humic Acid @ 0.3% foliar spray	T <sub>9</sub>
10	Pressmud (2.5 t ha <sup>-1</sup> ) + Humic Acid @ 0.1% foliar spray	T <sub>10</sub>
11	Pressmud (2.75 t ha <sup>-1</sup> ) + Humic Acid @ 0.2% foliar spray	T <sub>11</sub>
12	Pressmud (3 t ha <sup>-1</sup> ) + Humic Acid @ 0.3% foliar spray	T <sub>12</sub>
13	Control	T <sub>13</sub>

**Table 2. Effect of organic manures along with Humic acid on growth attributes of Thuduvai (*Solanum trilobatum* L.)**

Treatments	Plant height (cm)	Number of branches plant <sup>-1</sup>	Number of leaves plant <sup>-1</sup>	Leaf area (cm <sup>2</sup> )
T <sub>1</sub>	150.77	32.24	566.28	26.65
T <sub>2</sub>	113.10	21.69	444.38	20.54
T <sub>3</sub>	159.87	34.23	594.39	28.06
T <sub>4</sub>	144.23	30.04	544.55	25.57
T <sub>5</sub>	128.75	25.85	494.44	23.02
T <sub>6</sub>	166.42	35.97	615.65	29.13
T <sub>7</sub>	122.18	24.06	472.84	21.94
T <sub>8</sub>	106.48	19.92	422.56	19.43
T <sub>9</sub>	135.34	27.62	516.17	24.12
T <sub>10</sub>	157.36	33.56	587.97	27.77
T <sub>11</sub>	119.17	23.43	466.24	21.67
T <sub>12</sub>	137.70	28.31	522.96	24.46
T <sub>13</sub>	100.90	18.19	400.99	18.34
SED	1.56	0.53	4.79	0.39
CD (p=0.05)	3.14	1.07	9.64	0.79

**Table 3. Effect of organic manures along with Humic acid on leaf yield attributes of Thuduvai (*Solanum trilobatum* L.)**

Treatments	Leaf yield (g plant <sup>-1</sup> )	Leaf yield (kg plot <sup>-1</sup> )	Estimated leaf yield (t ha <sup>-1</sup> )	Dry matter production	Chlorophyll content index
T <sub>1</sub>	181.97	1.64	8.98	185.30	40.68
T <sub>2</sub>	114.84	1.03	5.67	166.22	28.52
T <sub>3</sub>	198.67	1.78	9.63	190.03	43.65
T <sub>4</sub>	170.30	1.53	8.40	182.11	38.67
T <sub>5</sub>	141.42	1.27	6.98	174.49	33.72
T <sub>6</sub>	209.63	1.88	10.35	193.23	45.70
T <sub>7</sub>	130.89	1.17	6.46	171.03	31.58
T <sub>8</sub>	104.35	0.93	5.15	162.27	26.42
T <sub>9</sub>	153.39	1.38	7.57	177.49	35.80
T <sub>10</sub>	193.31	1.73	9.54	188.61	42.75
T <sub>11</sub>	125.47	1.12	6.19	169.51	30.65
T <sub>12</sub>	158.80	1.42	7.82	178.87	36.64
T <sub>13</sub>	61.02	0.54	3.01	159.78	21.39
SED	1.95	0.031	0.19	1.07	0.66
CD (p=0.05)	3.94	0.064	0.41	2.19	1.36

essential nutrient and also due to higher phosphorous fertilization by a symbiotic mycorrhizal association as observed by Anilkumar et al.,(2007).

**Leaf yield parameters:** Yield is a complex phenomena which can be controlled both by morphological and physiological parameters and it can also be manipulated by either genetics factors or cultural operations. The major yield components of thuduvalai are mainly leaves and these components are directly related in increasing the total dry matter production of shoots which are commercially used. In the present investigation, table 2 shows the higher fresh leaf yield ( $209.63 \text{ g plant}^{-1}$ ), maximum leaf yield ( $1.88 \text{ kg plot}^{-1}$ ) and estimated leaf yield ( $10.35 \text{ t ha}^{-1}$ ) were registered in the treatment which received the combined application of Vermicompost ( $3 \text{ t ha}^{-1}$ ) along with Humic acid @ 0.3 per cent foliar spray at 60, 90 and 120 DAT. This may be attributed to fact that under increasing fertility levels by the application of organic manures there would be luxuriant growth of the plant, which lead to production of more number of branches, leaves and ultimately resulting in higher leaf yield  $\text{ha}^{-1}$ . The results are similar to the findings of Sendhilmathan and Karuppaiah (2008) in periwinkle. Vermicompost improve the soil physical condition and promotes organic matter, which in turn, produce organic acids, which inhibits particularly IAA oxidase enzyme, resulting in enhancing the promotive effect of auxin-IAA, which has direct effect on plant growth, herbage yield. The reasons for maximum leaf yield recorded in the best treatment was due to the combination of organic manure and foliar spray of humic acid activated the vegetative development of plants and quick nitrogen uptake by the plants vigorously which leads to better performance. Similar findings were also reported by Sailaja *et al.*, (2010) and Jyoti Nema *et al.*, (2008) in medicinal coleus

## Conclusion

Based on the present investigation, it can be concluded that the application of Vermicompost ( $3 \text{ t ha}^{-1}$ ) along with humic acid 0.3 per cent was found to be beneficial in improving the growth and leaf yield of Thuduvalai.

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