

**COMPARATIVE STUDY OF APPLICATION OF CHEMICAL AND BIOFERTILIZER FOR BETTER GROWTH OF *Vitex*, A MEDICINAL PLANT**NIHARIKA DEWANGAN<sup>a1</sup>, RANJANA SHRIVASTAVA<sup>b</sup> AND A. K. SHRIVASTAVA<sup>c</sup><sup>ab</sup>Govt. V.Y.T.P.G. Autonomous College, Durg, Chhattisgarh, India<sup>c</sup>Govt. D.T. College, Utai, Durg, Chhattisgarh, India**ABSTRACT**

*Vitex* commonly known as nirgundi belongs to family Verbenaceae, is an important medicinal plant. The plant parts of *vitex* are used as a traditional medicine by tribal people of Chhattisgarh in various part of the state. Leaves of plant possess alkaloids, reducing sugar, glycosides, sterol, resins, and tannins. It is found curative in asthma, lung disease, urinary trouble, tonsillitis, rheumatism etc. The dry leaves protect grains from insects and it is also found that smoke of leaves repels mosquitoes. Thus *vitex* being an important medicinal plant needs better fertilizer application for better cultivation and production. The plant can be easily propagated through stem cutting and roots so should also be planted in house. There is also a need to create awareness among the common people about the nirgundi plant and its various uses. The present study is focused on the application of biofertilizer in *Vitex* plant.

**KEYWORDS:** *Vitex*, medicinal plant, nirgundi, biofertilizer

The genus *Vitex* commonly known as Chaste tree comprises of about 250 species (Gupta, 1945). It is distributed in most of the part of the world including India. In India it is found almost all regions. It is distributed in humid places or wetlands and mixed open forest. It grows on sandy soil. (Chowdhury *et al*, 2009). In present study *Vitex negundo* is taken since it is easily available nearby. It is a woody shrub growing to about 10-15 feet high. Its bark is grey in color, thin and stem requires pruning to develop strong structure. (Edward *et al*, 1994). It is grown as hedge and ornamental plants. It is widely used for medicinal purpose. It is used in agricultural practices as manure, pesticides, growth promoter, in reclamation of wasteland and soil erosion, shoots used in basketry, witchcraft. (Ahuja *et al*, 2008).

**Systematic position of *Vitex negundo*:**

Kingdom: Plantae

Order : Lamiales

Family: Lamiaceae

Genus: *Vitex*Species: *negundo***Uses:**

**Medicinal use:** It is used in herbal medicine in bronchitis. The leaves are astringent, sedative, tonic and vermifuge. They are useful in dispersing swelling of the joints from acute rheumatism, (Chopra *et al*). It

is used in traditional medicine, ayurveda, unani medicine, chinese medicine, western herbal medicine, folk medicine etc. It possesses antiinflammatory, antibacterial, antifungal, antioxidant, anticonvulsant, anti allergic and enzyme inhibitory activity. It is used in neutralization of snake venom (Ahuja *et al* 2015, Vishwanathan *et al* 2010). **Edible:** Seeds are occasionally used as condiments (Kunkel, 1984). A tea is made from roots and leaves of nirgundi.

**Biocontrol agents:** Leaf extract possesses insecticidal activity. Dried leaves are burned to remove insects in rice fields (Ahuja *et al* 2008). The leaves are used to repel insects in stored grains.

**Other uses:** The young stems are used in making baskets. Its wood is firewood.

**Azotobacter and urea fertilizer**

Biofertilizers are the living microorganisms that are applied to the soil to improve plant growth. They enhance growth of plants by absorbing and fixing nitrogen, producing auxin and cytokinin plant growth hormones and by many other mechanisms. (Kloepper 1980). The rhizobacteria which are used as biofertilizer to promote the growth of plants are known as plant growth promoting rhizobacteria (PGPR). Among PGPR azotobacter is given specific attention and proved as better inoculants used as biofertilizer for plant growth.

Urea is an organic compound with chemical formula  $\text{CO}(\text{NH}_2)_2$ . It is solid, colorless, odorless and widely used as fertilizer in agriculture to fulfill the nitrogen requirement of plants.

## MATERIALS AND METHODS

In the present study the Vitex plant is propagated by 12-15 inch long shoot in three pots containing sterilized soil. The shoots were taken from healthy plants. Two different fertilizers for fast and better growth of plant are applied. One is urea as chemical fertilizer, the treatment is named Tu and the other is plant growth promoting rhizobacteria, azotobacter as biofertilizer, this treatment is named Ta. No fertilizer applied plant is considered as control and named Tc. The experiment is conducted in triplicate. The plants were watered every day and the

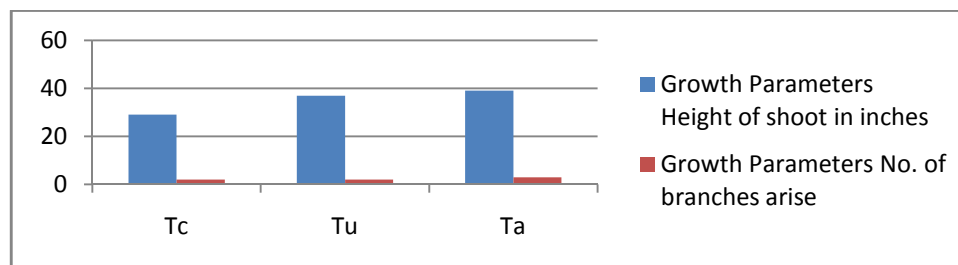
growth parameters such as height from soil level and branching was observed for 4 months from propagation.

## RESULTS AND DISCUSSION

In the present study the two growth parameters were studied. It is observed that the plant of Ta treatment grows higher with more branching after one pruning than the plants of Tu treatment. But there is not much difference in these two parameters. Both the treatments i.e. Tu and Ta show more growth and branching over control i.e. Tc. After four months of observation the Tu plants grows 37 inches high with two new branches and the Ta plant grows 39 inches high with three new branches. Tc plant grows 29 inches high with two new branches.

**Table showing different parameter on different treatments**

S. No.	Treatment	Growth Parameters	
		Height of shoot in inches	No. of branches arise
1.	Tc	29	2
2.	Tu	37	2
3.	Ta	39	3



**Graph representing different parameter.**

## CONCLUSION

Although 95% of world production of urea is used as a nitrogen-release fertilizer. The most common impurity of synthetic urea is biuret which impairs plant growth. So now a day much interest towards biofertilizers is growing in most of the countries. So use of azotobacter as biofertilizer can be considered as the best inoculants for plants like nirgundi which shows slow growth but is completely medicinal. Proper attention is required for its cultivation since it needs pruning time to time. Work

is in progress to measure various other growth parameters and the medicinal property of the plant on application of chemical and biofertilizers.

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