

Impact of paper mill effluent, farm yard manure and biofertilizer amendment on soil, growth and bio chemical constituents of *Vigna radiata* (L.) Wilczek

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SUMMARY

Studies on the effect of paper mill effluent in combination with farm yard manure and biofertilizers on soil, growth, biochemical constituents and nodulation of green gram were carried out under potted condition. The growth parameters such as shoot length, root length and biomass were increased upto 50% concentrations of the effluent in combination with FYM and BF. The chlorophyll content was exhibited a slight increase in 25 and 50% concentrations in combination with FYM and BF. The bacterial and fungal populations were also studied. Higher populations were seen at 50% concentration. Root nodulation also showed a significant increase at 50% effluent treatment. All these parameters decreased progressively with further increase in the effluent concentration viz., 75 and 100%.

Key words :

Green gram,
Vigna radiata,
Paper mill
effluent,
Phytotoxicity,
F.Y.M.,
Biofertilizer

Water is the most precious thing in the world. Nowadays, most of our water resources are gradually becoming polluted by addition of huge amounts of sewage, industrial and agricultural effluents. These effluents contain materials with varying properties from simple nutrients to highly toxic substances. The discharge of industrial effluents with varying amounts of pollutants has altered the water quality.

Water requirements to meet agricultural, domestic, industrial and other demands indicate the need for regeneration of waste waters. Discharge of effluents with high load of pollutants into the rivers has been studied extensively. Waste water from paper and pulp industry could successfully be used for irrigation, it would be possible to prevent river water pollution (Oblisami and Palaniswami, 1991). Several studies have been done on the impact of various industrial effluents on various crops (Lakshmi and Sundaramoorthy, 2001; Kaushik *et al.*, 2004). The combined use of FYM and BF might provide the soil with need based nutrients and with better physical and microbiological environment, thus improving the soil fertility and productivity. This is in agreement with (Baronia, 2000; Dubey, 2000; Kalaichelvi, 2001; Rajeswari, 2003).

MATERIALS AND METHODS

The treated effluent discharged from Seshassayee Paper and Boards Limited, Pallipalayam, Namakkal District, Tamil Nadu

was used as irrigation water in the present study.

Uniform seeds of green gram [*Vigna radiata* (L.)] Wilczek obtained from Department of Pulses, Tamil Nadu Agricultural University, Coimbatore were surface sterilized with 0.1% HgCl₂ and washed thoroughly. Earthen pots (30 cm x 20 cm) were filled with field soil and farm yard manure in the ratio of 5 : 1 (FYM : Soil). In biofertilizers, the pot was filled with 5 : 1 ratio (Soil : Biofertilizer). The carrier based inoculum packets of Rhizobium and Phosphobacteria were obtained from Department of Agricultural Microbiology, Tamil Nadu Agricultural University, Coimbatore. The pots were drenched with different concentrations (25, 50, 75 and 100%) of the effluent and left as such for 1 week. Five replicates were maintained for each treatment. The pots were sown with KM2 variety of green gram at the rate of 10 seeds per pot and watered with the respective effluent concentration.

The plants were uprooted on 20th day after sowing. The measurement for length (shoot and root) and biomass were made. The number of root nodules in the root system was counted and expressed as individuals plant⁻¹. Chlorophyll was estimated as per Yoshida *et al.* (1976). Protein estimation was done following Lowry *et al.* (1951) method. Dilution plate method was employed for the enumeration of microbial population in the soil

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