

SOME BIOCHEMICAL STUDIES OF ROAD SIDE PLANT *Nicotiana tobaccum* OF WESTERN U.P.

Sushain Chaudhary

GGSSS, Chulkana, Teh.-Samalkha, Distt.-Panipat
E-mail: sushainchaudhary@gmail.com

Abstract—Total N,P and heavy metal of road side grown *Nicotiana tobaccum* plant parts and soil sample were determined. High soil contents of toxic or total heavy metals have been observed in the proximity of road side grown plant as compared to plant grown at 200 m distance away from road side. Likewise level of total Nitrogen and Phosphorous also showed variations in different plant samples depending upon the extent of automobile exhaust released along road side.

Saharanpur District is located at the latitude of 29° 28'N and at the longitude of 77°33' E. It has 270.8 meters altitude above the sea level. A small stream named DHAMOLA passes through the main city and carries all municipal waste etc. which finally confluence with river, Hindon near Tapri. The main roads run to towns of Behat and Chakrota in the north; Mohand and Dehradun in Northeast ; to Roorkee and Haridwar in the east; to Deoband and Muzaffarnagar in south-east; to Delhi in the south ; to Nakur and Gangoh in south-west; to Ambala in West. It is by the total side *Nicotiana Tobaccum* Plant is grown , which is affected by automobile exhaust released from the traffic density on these roads.

Keywords: *Nicotiana Tobaccum*, biochemical studies, nitrogen, phosphorous.

1. INTRODUCTION

In the last few decades concern about human health hazards associated with heavy metals in soil and plant has considerably increased (Azad et al 1984; Zwart and Sloof, 1989). Therefore, studies were carried on *Nicotiana tobaccum* plant growing along road side in the fields of the Saharanpur district. Plants samples of Plant as given above were collected from different road side of Saharanpur at following three stages:-

- ❖ Vegetative stage
- ❖ Flowering stage
- ❖ Yield stage

Samples of this plant was used for various biochemical estimation.

2. MATERIALS AND METHODS

For the investigations plant was carefully dug out from the unpolluted (200 mt. away) and polluted soil (20 mt. away) near roadsides keeping the root and shoot system intact at 3 stages of a growth at appropriate ages in between 30th to 120th day.

These plants was thoroughly washed to remove soil particles. The root, shoot, pod, fruit and seed parts of these plants were separated and dried in oven at 80^o C for 36 hours. Similarly soil samples of both these farmland were also collected from the same fields. These soil samples were kept in polythene containers already washed with 1: 1 nitric acid and de-ionized water to avoid adsorption of heavy metals on the container walls and to preserve the samples for subsequent analysis of total nitrogen, phosphorous and heavy metal.

2.1 Total nitrogen estimation

For total nitrogen estimation, digestion was done according to Snell and Snell (1954) and later estimation of the digest was done calorimetrically.

The estimation of digest was done with Nessler's reagent of Koch and Mc. Meekin's formula (Oser, 1965). Amount of Nitrogen was calculated by using a calibration curve.

2.2 Total phosphorous

For the estimation of total phosphate, the digestion was done by 60% perchloric acid (HClO₄) and 30% hydrogen peroxide (H₂O₂). Absorbance was read at A₅₂₅ nm (Allen, 1940) and the amount of phosphate was then determined quantitatively by using a calibration curve.

2.3 Total heavy metals

For estimation of total heavy metals, dry samples were digested in a mixture of 60% perchloric acid and concentrated nitric acid and then it is heated to dryness. The residue is dissolved in ammonium citrate buffer, from this solution heavy metals were extracted with the help of purified dithizone. The quantities was estimated with the help of

standard and calibration curve based on the methods suggested by Sandell (1950).

3. RESULTS AND DISCUSSION

Result of total heavy metals total N and P in the plant part collected from different distances along road side, is shown in Table-1. Amount of total heavy metals were found more in the soil and plant parts growing in the proximity of road side as compared to those growing at 200 mt. distance away from the road. Thus the data in the Table-1 provide further evidence at the difference in heavy metals in road side plant is probably linked to the quantity of automobile exhaust pollutants or traffic density on the road side.

Table 1: Biochemical characteristics of *Nicotiana Tabaccum* growing under field conditions near road side (20 mt. = control) and away from road side 200 mt = experimental)

Site	Farm Soil	Root	Shoot	Seed
Mg/g Dry weight				
Ambala Road				
Total Nitrogen				
Control	36.26	9.50	11.00	8.60
Experimental	37.10	11.10	12.10	10.00
Total Phosphate				
Control	4.80	7.60	9.60	8.80
Experimental	5.20	8.30	10.65	10.20
Total Heavy metal				
Control	0.310	0.118	0.146	0.035
Experimental	0.360	0.140	0.158	0.046
Dehradun Road				
Total Nitrogen				
Control	34.20	11.80	9.40	8.60
Experimental	36.30	13.00	9.85	9.10
Total Phosphate				
Control	5.50	6.75	8.30	8.60
Experimental	6.10	8.40	10.85	9.30
Total Heavy metal				
Control	0.316	0.110	0.108	0.032
Experimental	0.358	0.135	0.132	0.045
Delhi Road				
Total Nitrogen				
Control		10.10	7.40	8.24
Experimental		10.80	8.90	10.30
Total Phosphate				
Control	4.60	7.50	8.50	8.10
Experimental	5.28	9.00	10.30	9.50
Total Heavy metal				
Control	0.315	0.110	0.108	0.040
Experimental	0.363	0.128	0.128	0.054

Thus, in view of health safety it is suggested that while using plant one must avoid road side plant in order to reduce the intake of heavy metal in the body.

Table also shows that Total Nitrogen and Phosphorous uptake and distribution in the *Nicotina Tobaccum* plant parts of road side. Levels of both Nitrogen and Phosphorous do not show much variation in the sample collected from different distances away from road side. However, there is some decline in both these parameters from proximity to more distances away from road side. Our these result are in agreement to various work done (Bhargava, P 2002; Richa *et al* 2003; Mookerjee 1988; Dhiman, 2009).

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