



ISSN : 0973-7057

Int. Database Index: 663 www.mjl.clarivate.com

Effect of automobile pollutions on chlorophyll content of avenue trees along state highway between Saharsa to Supaul

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Received : 22nd December 2019; Revised : 21st February 2020

Abstract: Automobile exhaust contains a large number of air pollutions. Among the important constituents of pollutants are carbon monoxide, unburnt hydrocarbons, Nitrogen oxide, particulates and lead. These vehicle pollutions adversely affect Avenue trees by chlorosis, damage leaves and reduces Nutrient uptake. In the present study chlorophyll content of four Avenue trees- *Ficus religiosa*, *Ficus bengalensis*, *Delonix regia* and *Cassia fistula* was estimated and compared with that of trees far away from the road side.

Key words: Automobile, pollutant, chlorosis, Avenue trees

INTRODUCTION

Automobiles are “necessary evil” while they have made living easy and convenient, they have also made human life more complicated and vulnerable due to toxic emissions. Human beings, animals and vegetation are being adversely affected by the air pollutants emitted from vehicles.

Petrol engine automobiles emit carbon monoxide, unburnt hydrocarbons, nitrogen oxides, sulphur oxides, particulates and lead while diesel engine automobiles emit unburnt hydrocarbons, Nitrogenoxides, sulphur oxides smoke and odour.

The highest emission rate occurs during motor idling, deceleration and at slower speed. During idling and slow speeds the greatest emission is of carbon monoxide and Hydro carbons with Nitrogen.

These pollutants cause chlorosis, leaf damage leaf curling and other several adverse effects on vegetation.

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MATERIAL & METHODS

The study area was selected from Saharsa to Supaul (40km). Branches of selected Avenue trees (*Ficus religiosa*, *Ficus bengalensis*, *Delonix regia* and *Cassia fistula*) were collected in summer, rainy and winter seasons.

Chlorophyll content of leaves from each plant was estimated in laboratory. 250 mg of fresh leaves were cut into small pieces and transferred in 25 ml 80% acetone. It was incubated in dark for 24 Hrs. absorbance at the extract was taken at 645 nm and 663 nm with spectrophotometer. Chlorophyll was estimated by the formula (Arnon, 1949).

$$\text{Total Chlorophyll} \left(\frac{\text{mg}}{\text{gm}} \text{ Fw} \right) = \frac{20.2(A_{645}) + 8.02(A_{663})}{1000X \text{ Fw}} \times V$$

A_{645} = Absorbance at 645 nm

A_{663} = Absorbance at 663 nm

V = Volume of Chlorophyll extract

Fw = Weight of fresh leaves

RESULT

Chlorophyll estimation of four different plants from road side between Saharsa and Supaul State Highway and

chlorophyll estimation of same plants far away from road side was estimated in different seasons - summer, winter and rainy season. The result is tabulated in Table No.-01 and 02.

Table No.-1 Chlorophyll estimation at Road side Trees

SN. No.	Botanical Name	Common Name	Family	Season	Total Chlorophyll
1	<i>Ficus religiosa</i> L.	Peepal	<i>Moraceae</i>	Summer	0.0179
				Winter	0.0181
				Rainy	0.0184
2.	<i>Ficus bengalensis</i> L.	Burgad	<i>Moraceae</i>	Summer	0.0226
				Winter	0.0230
				Rainy	0.0238
3.	<i>Delonix regia</i> Raf.	Gulmohar	<i>Caesalpinaceae</i>	Summer	0.0235
				Winter	0.0241
				Rainy	0.0245
4.	<i>Cassia fistular</i> L.	Amaltash	<i>Ceasaltiniaceae</i>	Summer	0.0205
				Winter	0.0209
				Rainy	0.0214

Table No.-2 Chlorophyll estimation of Trees far away from Road side

Sl. No.	Botanical Name	Common Name	Family	Season	Total Chlorophyll
1	<i>Ficus religiosa</i> L.	Peepal	<i>Moraceae</i>	Summer	0.0187
				Winter	0.0188
				Rainy	0.0191
2.	<i>Ficus bengalensis</i> L.	Burgad	<i>Moraceae</i>	Summer	0.0233
				Winter	0.0236
				Rainy	0.0242
3.	<i>Delonix regia</i> Raf.	Gulmohar	<i>Caesalpinaceae</i>	Summer	0.0240
				Winter	0.0247
				Rainy	0.0251
4.	<i>Cassia fistular</i> L.	Amaltash	<i>Ceasaltiniaceae</i>	Summer	0.0213
				Winter	0.0216
				Rainy	0.0222

CONCLUSION

A large number of Truck, Bus, Car, Auto, Tractor and several other heavy vehicles continuously passes through State Highway between Saharsa and Supaul. The pollutant released from these vehicles adversely affect avenue trees present at the road side. The Chlorophyll content of leaves decreases and chlorosis may occur. The chlorophyll content of leaves is greatly effected in summer as the air remain hot and pollutant passes upwards while in winter season the air remain cold so the density of natural gasses of air is higher hence, pollutant passes upward slowly. In rainy season due to rain most of the heavy pollutant including Nitrogen and Sulphur dioxide dissolve in water and settle down at ground. As the pollutant are very low in country side so the chlorophyll content of these trees are higher.

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