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Advances in Applied Science Research, 2011, 2 (4):371-373



### Presence of Lead in the roadside soil of Aurangabad City.

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#### ABSTRACT

*The amount of lead metal present along the roadside of Aurangabad –Nasik road was determined near the Aurangabad city. The soil analysis reveals that the effect of direction of wind flow accumulation of lead. There was a decrease in the soil lead with increasing distance from the motor way due to a decrease in the rate of aerial deposition. At both the sites, lead concentration did not reach the back ground level even at the depth of 11cms.*

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#### INTRODUCTION

Lead is a toxic metal. Its toxicological and hazardous effect has been reported earlier.<sup>1-2</sup> Lead gets assimilated through food or skin in various occupations<sup>3</sup>. Lead-content in human tissues of lead worker has been found in particularly in organs like pancreas, spleen, kidney, lungs and bones<sup>4-5</sup>.

The main source of lead is road based transport. These systems are dependent on the use of fuel, which leads to pollution problem. In most of the vehicles, lead tetra alkyl was used as an antiknocking agent. The toxicity of lead alkyls is considerably greater than that of lead particles. It was found that tetra methyl lead is the only lead alkyl present in measurable amounts within 30m of a heavily travelled highway<sup>6</sup>. Although nowadays lead free petrol is widely used, the soil of roadside still contains lead. It is non degradable inorganic compound and hence its persistence in the atmosphere is for longer time. Therefore we decided to study the presence of lead in the soil of Aurangabad along the roadside of Mumbai high way. Literature survey revealed that lead has treater inhibition effect on the root growth of plants<sup>7</sup> Lead also gets accumulated in the insect body. Some researchers<sup>8</sup> found that insect from road side (13000 vehicles per day) may accumulate 8ppm of Pb.

## MATERIALS AND METHODS

For present study we selected Mumbai high way approaching to Aurangabad city it has now a days traffic intensity of average 300 vehicles per day. Different samples were collected from both the sides of road way. The sample of surface soil and sub surface soil were dried separately and a definite quantity of sample was digested with aqua regia (3:1 HCl and HNO<sub>3</sub>) for about 6 hours it was filtered, cooled and diluted to definite volume. The concentration of lead in the soil solutions were determined using atomic absorption spectrophotometer.

## RESULTS AND DISCUSSION

Lead contamination of surface soil along road side depends upon various factors like traffic density, direction of wind distance from the road side etc. The level of lead in urban area is more than rural area<sup>9</sup>, it is inversely proportional to the distance from the road side along which the traffic passes the concentration of lead in street dust was greater in the city centre then the lead in peripheral streets<sup>10</sup>.

In the presence study the concentration of lead along both the road side was found different. The higher concentration of lead south side of the road may be due to the direction of flow of wind. For dry weather and flat land with little vegetation coverage, direction of flow of wind governs the accumulation of lead on soil surface. The concentration on both the sides decreases when approach to 10m. This shows the lesser mobility of lead. On south side the average surface lead observed to 62.5ppm at 0.5m. from the edge (max. 65.5ppm; min. 60.2ppm) where as at 10m distance from road edge average concentration of lead decreases to 46.1ppm (max. 49.2ppm; min.41.4ppm) this is in agreement with previous workers.<sup>11</sup>

**Table 1 The distribution of Pb (ppm) along south roadside at different distance in surface and subsurface soil**

Sample	Surface		Sub-surface	
	0.5m Dist	10 m Dist	0.5 m Dist	10 m Dist
S1	60.2	45.7	30.2	18.2
S2	64.0	48.3	25.8	19.7
S3	60.2	46.3	27.6	22.1
S4	65.1	41.4	28.9	17.9
S5	63.3	49.2	23.7	18.4
Avg	62.5	46.1	27.4	19.2

**Table 2 The distribution of Pb (ppm) along north roadside at different distance in surface and subsurface soil**

Sample	Surface		Sub-surface	
	0.5m Dist	10 m Dist	0.5 m Dist	10 m Dist
S1	43.3	3.7	11.9	0.0
S2	41.2	8.3	11.8	1.0
S3	42.5	3.1	13.3	0.0
S4	42.6	8.6	14.8	1.2
S5	44.7	9.8	13.4	1.3
Avg	47.2	6.7	13.0	1.1

The sub-surface concentration of lead varies from 25.8 to 30.2ppm with an average value of 27.2ppm near the road edge but at 10m it varies in between 17.9 to 22.1ppm (avg. 19.2ppm) at

the one side of the road. On the north side of the road, surface lead has average value 42.8ppm near the road edge and 13.0ppm at 10m distance from the edge. Surface samples analysed shows average 6.7 near the road edge and negligible at the 10m from the edge. Staffan Akerblom et al reported that the level of lead in the humus layers decreases with depth and it has adverse effect on organic matter composition<sup>12</sup>. Inorganic lead compounds are carcinogenic in animals and have carcinogenic potential in human. In mice lead is transplacental carcinogenic in the kidney<sup>13</sup> The present investigation shows that the soil is still contaminated with lead.

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