

Analysis of Atomic Absorption Spectra of Lead Present in Road Side Plant Leaves and its Harmful Effects on Human Being



Science

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Asha Verma

Govt. Science & Commerce College Benazir, Bhopal.

Ranjana Pateriya

Govt. Home Science P.G. College, Hoshangabad

ABSTRACT

This paper consists of data of postmonsoon lead (Pb) concentration in *Lowsonia inermis* (Mehandi), *Tamarindus indica* (Imli), *Angle marmelos* (Bael) and *Psidium guajava* (Amrud) in washed and unwashed plant leaves. The analyzed data shows the highest and lowest concentration of Pb in unwashed plant leaves were found in *Angle marmelos* i.e. 5.706 PPM and *psidium guajava* of i.e. 3.906PPm. And the highest and lowest concentration of Pb in washed plant leaves were found in *Angle marmelos* i.e.5.254PPm and in *psidium guajava* i.e.3.096PPm respectively in Bhopal district.

Introduction :

The information about sources of lead as heavy metal pollutant in Bhopal environment are industrial production processes and their emissions. lead is generally added to the environment by aerial deposition alongside the roads are proportional with the high density of traffic and distance from the road side¹. Lead is one of the major environmental concern pollutant shows letter effects including damaging of vital Nervous system. lead and lead compounds are found in all parts of our environment. Exposure to high level concentration of lead can severely damage the brain and kidney of human being and ultimately cause the death. Target organs are the bones, brain, blood kidney and thyroid gland. It was of interest to study its effect on four important plants leaves, *Lowsonia inermis*, *Tamarindus indica* *Angle marmelos* and *Psidium guajava*. leaves of higher plants have been used for bio monitoring heavy metal. Leaves of higher plants have been used for biomonitoring heavy metals since 1950²In the past few decades the use of higher plant leaves as a biomonitoring of heavy metal pollution in the terrestrial environment.³⁻⁵

Materials and method :

Sample of plant leaves were collected from road side of busy university area in Bhopal during june 2009, plant samples were divided into two sub samples one sub-sample was thoroughly washed with double distilled water to remove dust particles and the other remained untreated (Unwashed).

Sample preparation- The method used for the plant digestion is same as described AOAC et. al. three gram of sample taken in conical flask and add 10ml. concentrated HNO₃ and left it over night. All conical flasks kept on hot plate with gentle heating and evaporate to dryness. Again add 10ml concentrated HNO₃ and remove it by heating. this process was repeated until the residue became white, in the obtained white residue of sample add 5ml. of digestion mixture (Concentrated HNO₃ & Concentrated HClO₄) Now these samples were heated gently on hot plate for complete digestion, after dryness digested samples were transferred to the 10ml volumetric flask and make up with 1% nitric acid.

Instrumental analysis :

The concentration of Lead in all important vital plant samples were estimated by AAS technique using (GBC Avantz)

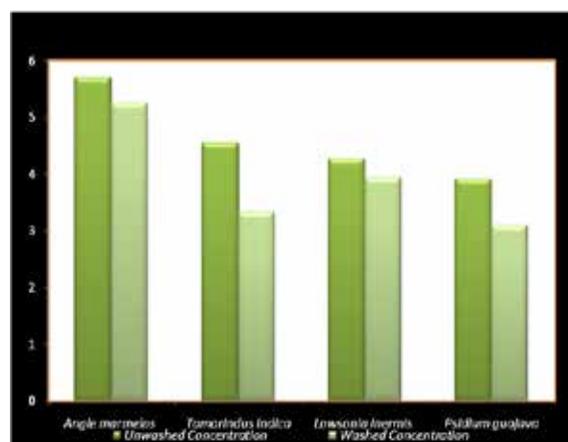
Result and discussion :

The mean concentration of lead (Pb) in unwashed and washed road side plant leaves are shown in table-1. The highest concentration of lead (Pb) among all the washed and unwashed plant leaves found in *Angle marmelos* (Bael) i.e. 5.706 PPM. The accumulation of lead in four plant species : *Angle marmelos*, *Tamarindus indica*, *Lowsonia inermis*, *Psidium guajava* were examined in the present study. All species were

collected from university road side because of high density of vehicles.

Table - 1
Concentration of estimated Pb in unwashed and washed road side plants leaves.

S.No.	Name of plant species	Unwashed concentration	Washed concentration
1.	Angle marmelos	5.706 PPM	5.254 PPM
2.	Tamarindus indica	4.548 PPM	3.330 PPM
3.	Lowsonia inermis	4.272 PPM	3.942 PPM
4.	Psidium guajava	3.906 PPM	3.096 PPM



Harmful effect of lead on human being

Lead can trigger both acute and chronic symptoms of poisoning. Chronic intoxications can arise through the regular consumption of foodstuffs only slightly contaminated with lead.

Some disease causes on human being

- ✓ Encephalopathies in the central nervous system (CNS)
- ✓ Disturbances in kidney and liver functions : progressing as far as necrosis.
- ✓ Damage to the reproductive organs.
- ✓ Anaemias and many metabolic deficiency symptoms.

Harmful Effects on plants

Apart from Zinc, a range of other heavy metal, such as aluminium (shem et al.1972)⁶, Cadmium (Kalita et al.1993, Saravanan et al.1997)⁷⁻⁸, Chromium (Corradi et al, 1993)⁹, Mercury (Ganesan & Manoharan1983)¹⁰, and Nickel (Vijayarengan 1993)¹¹, also cause similar reduction in growth of the seedlings.

A survey of road side heavy metal contaminant in Hong Kong found a significant correlation between traffic density and Pb, Cu, and Zn concentration, Pb is less mobile than the Cd and Zn¹².

Conclusion

It is a point of interest that the concentration of Pb is higher in unwashed plant leaves than washed plant leaves. It shows that rainfall may decrease these metals concentration in road side plants, which are then useful to human being for vital uses. High concentration of edible road side plants leaves increases toxic effect in human being e.g. cardiovascular disease and disruption of nervous system. Thus at average rainfall may decrease these Pb (heavy metal) concentration in road side plants to protect human being from various disease.

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