

**HEAVY METAL ANALYSIS OF *DERRIS TRIFOLIATE*– A MEDICINAL PLANT****Willy J. Shah\*<sup>1</sup>, Suhas P. Janwadkar\*<sup>2</sup>, Siddhi Mhatre\*<sup>3</sup>, Siddhesh B. Mangaonkar\*<sup>4</sup>**

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**ABSTRACT**

The aim of the present study is to detect the concentration of the heavy metal in plants. Higher concentration of heavy metals can lead to change in plant growth, metabolism rate as well as change in the synthesis of phytochemical. The plant samples were collected, washed, dried and acid digested. The resulted solution was aspirated into Atomic Absorption Spectrometer to find out the concentration of heavy metals such as Iron, Copper, Lead, Cadmium, Zinc and Chromium and found to be 0.235, 0.027, 0.001, 0.007, 0.048 and 0.005 mg/gm respectively.

**Keywords:** Heavy Metal Analysis, Atomic Absorption Spectrometer, *Derris Trifoliata*.

**I. INTRODUCTION**

Although heavy metals are naturally present in the soil, geologic and anthropogenic activities increase the concentration of these elements to amounts that are harmful to both plants and animals. Some of these activities include mining and smelting of metals, burning of fossil fuels, use of fertilizers and pesticides in agriculture, production of batteries and other metal products in industries, sewage sludge, and municipal waste disposal [1].

Growth reduction as a result of changes in physiological and biochemical processes in plants growing on heavy metal polluted soils has been recorded [2]. Continued decline in plant growth reduces yield which eventually leads to food insecurity. Therefore, the remediation of heavy metal polluted soils cannot be overemphasized.

Therefore it becomes important to study the concentration of such heavy metals in the plant. Accumulation of heavy metal leads to increase in concentration of heavy metals. Higher concentration of heavy metal affects the plants growth and metabolism as well as change in the synthesis of phytochemicals.

**II. MATERIALS AND METHODS**

The plant material of *Derris trifoliata* were collected from Nallasopara region, Palghar district, Maharashtra. The plant was washed and dried in hot air oven at 40°C. The plant was grinded and sieved using 0.25 micro mesh size and stored in air tight container.

**Acid digestion procedure**

1g of dried plant sample was acid digested using a mixture of concentrated Nitric acid and Perchloric acid and diluted using type 1 water. The digested sample were aspirated into air-acetylene flame and the existence of metals was determined by Atomic Absorption Spectroscopy. The reproducibility was ensured by carrying out triplicate analyses. All the samples were analysed immediately after digestion.

**Instrumentation**

The quantitative analysis of heavy metals were determined with Agilent Technologies 200 series AA model equipped with hollow cathode lamp and acetylene burner. The absorption measurements of the metals were performed and the concentration of heavy metals were calculated.

**III. RESULTS & DISCUSSION**

Heavy metal analysis of *Derris trifoliata* were carried out to determine the concentration of heavy metal present in whole plant material. High concentration of these heavy metal can cause severe damage to the plant. The plant samples were collected, washed, dried and sieved using .25 micro mesh size. The fine powder was acid digested using mixture of concentrated Nitric acid and Perchloric acid. The resulted solution was aspirated into Atomic absorption spectrometer to find out the concentration of heavy metals such as Iron, Copper, Lead,

Cadmium, Zinc and Chromium and found to be 0.835, 0.027, 0.001, 0.007, 0.048 and 0.005 mg/gm respectively. The concentration of heavy metals was found to be within the range.

**Table 1:** Heavy metal concentration in *Derris trifoliata*

Sr.No	Heavy metals	Concentration (mg/gm)	WHO maximum permissible values (mg/gm)
1	Iron	0.235	0.4255
2	Copper	0.027	0.0733
3	Lead	0.001	0.0003
4	Cadmium	0.007	0.0002
5	Zinc	0.048	0.0994
6	Chromium	0.005	0.0013

#### IV. CONCLUSION

Heavy metal analysis of *Derris trifoliata* were carried out to determine the concentration of heavy metal present in whole plant material. The plant samples were collected, washed, dried and sieved using .25 micro mesh size. The fine powder was acid digested using mixture of concentrated Nitric acid and Perchloric acid. The resulted solution was aspirated into Atomic absorption spectrometer to find out the concentration of heavy metals such as Iron, Copper, Lead, Cadmium, Zinc and Chromium. According to WHO maximum permissible limit the concentration of heavy metals was found to be within the range. And hence the plant material can be used in further studies or for preparation of Ayurvedic formulations.

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