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# LEAD REMOVAL FROM CONTAMINATE SITE WITH PESTICIDES AND REDUCING ITS EFFECTS BY ACTIVITY OF ACTIVATED CHARCOAL AND LIMESTONE

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***Abstract :*** Lead poisoning is classically defined as exposure to high levels of lead typically associated with severe health effects, but being a heavy metal which is potentially toxic, if present at even minor concentrations, it is of great concern to environmentalists and medical professionals alike. Activated charcoal and limestone has been known to adsorb heavy metals and thus, was used in this study as well. The study was to decrease the lead content of agricultural soil which is attributed to the use of pesticides containing lead by using activated charcoal and limestone and comparing which is more effective. And it detected by atomic adsorption spectrophotometer by analyzing lead in each five day gap and estimating the lead adsorption.

***IndexTerms* – Activated charcoal, limestone,atomic adsorption spectrophotometer.**

## I. INTRODUCTION

Lead poisoning has a drastic effect on public health for centuries. Lead is a cumulative poison, exposure to it and its compounds is toxic to humans and affects ecosystem severely. Nowadays, it has become one of the important chronic environmental illness affecting present generation. Many major steps are taken to overcome this problem but serious cases of lead poisoning still appear in hospitals, clinics, and private physicians. Lead is non biodegradable. It persists in soil, air, drinking water, and in houses. It crosses all social, economical and geographical lines. Extensive use of industrially produced pesticides in agricultural lead results in contamination of soil ecosystems. Not only lead in pesticides pollutes the soil and its habitants but also accumulates in the plants treated with leaded pesticides, leading to bioaccumulation by entering the food chain. Lead also pollutes the ground water by accumulating in plant roots and thus entering the water table.

## 2. NEED OF THE STUDY

Lead removal from soil is essential by the increase of use of pesticides in agricultural soil its affecting the food products it was a concern in farmers so the need of study is essential and removal from the agricultural soil by the activity of adsorbents is essential and eco friendly adsorbents are used for the removal and here it is decreasing the lead content day by day by using the adsorbents. Contaminants in the environment pose a global problem for wildlife and human health. Phytoremediation is a recently developed technology that offers a cost effective solution by using plants, and associated soil microbes, to reduce the content, or toxic effects.

## 3. RESEARCH METHODOLOGY

### 3.1 Estimation of lead in agricultural soil and pesticides;

Sampling of agricultural soil and pesticides was done and both were examined for lead content soil was collected in a lead free polythene bags from agricultural field located in Vengeri Thadambattuthazham Calicut Kerala. Soil and methyl parathion and factomfose mix was collected separately in a lead free polythene bags. Testing was done on the agricultural soil and pesticides using Atomic Adsorption Spectrophotometer.

### 3.2 Estimation of lead in soil sample by each tray

Four trays were taken, first tray was kept as control tray (Tray 1), second tray (Tray 2) was taken to estimate lead content in the pesticides, and third tray, (Tray 3) was taken to check the activity of activated charcoal , (Tray 4) was taken to check the activity of limestone.

**Tray 1;** The soil was layered in the tray without any stones or any hard materials. 25g of methi seeds were sown on top layer of the soil. The soil was watered well daily up to 20 days
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**Tray 2;** The soil collected from agricultural field was taken in a tray enough to grow a plant. The soil was treated with 20gm pesticides named methyl parathion and factomfose. Methi seeds were sown in the tray uniformly.

**Tray 3;** The soil collected from agricultural field was taken a tray. The soil was treated with 20gm of pesticides. Activated charcoal was applied as a layer on top of soil with pesticides. Above a layer of activated charcoal a thin layer of soil was applied to support the growth of methi seeds were sown above it. Amount of lead present in soil estimated by atomic adsorption spectrophotometer.

**Tray 4;** The soil collected from agricultural field was taken in a tray with 20 gm of pesticides and applied a layer of 20gm of limestone were applied and pouring soil and above that methi seeds were sown on top layer of soil. Amount of lead in soil was estimated by atomic adsorption spectrophotometer on day 1,5, 10,15, and 20 days.

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## 4. RESULTS AND DISCUSSION

### 4.1 Estimation of lead in agricultural soil and pesticide;

The test was done prior before starting our analysis work. The soil was made even so that at the time of estimation. In the soil sample the lead concentration was found to be 10PPM which means lead is not detected in soil sample and was below the average value and thus is not harmful. In pesticides the lead content was above average value and thus it was harmful. Further analysis was done by taking this soil and pesticides as this study needed the soil which was free from lead to estimate the correct amount of lead.

### 4.2 Estimation of lead in agricultural soil samples;

**Tray 1;** The soil in control tray was estimated for lead by using AA Spectrophotometer and found to be not detected 10PPM. The soil in control tray was estimated for lead in Aa spectrophotometer on day 1. The result indicated that absence of lead. The lead content was found be increased to 13PPM on day 20

Fig 1 Methi plants grown on agricultural soil

**Tray 2;** On day 1, the soil was estimated for lead after mixing with pesticides. It gave a value of 13PPM. On day 5 it was estimated as 14PPM and on day 10 it was estimated as 14PPM. Here it was like increasing because of the activity of activated charcoal . On day 15 it was found that 16PPM and on day 20 it estimated as 18PPM so it crosses the limit and it was found that drastically increased to 18PPM.

**Tray 3;** The soil with pesticides after layering activated charcoal and soil above it was estimated for lead in atomic adsorption spectrophotometer. The level of lead was detected as 12PPM. On day 5 the soil with pesticides present below the layer of activated charcoal in tray 3 was estimated for lead. On day 10 the lead was found to be absent and it gradually decreases by the activity of activated charcoal.

**Tray 4;** The soil with pesticides after layering limestone and soil above it was estimated by atomic adsorption spectrophotometer. The level was detected as on day 13PPM and on day 10 it gradually decreases as 12PPM.

When comparison between activated charcoal and limestone it identified as activated charcoal having high capacity for the removal of lead in soil.

**4.3 Effects of adsorbents in different days**

The lead content was estimated in different days by the activity of adsorbents

| | Day 1 | Day 5 | Day 10 | Day 15 | Day 20 | Limit |
|---|---|---|---|---|---|---|
| Sample1=normal soil sample | 10PPM | 11PPM | 11PPM | 11PPM | 13PPM | <=15PPM |
| Sample 2= Sample with pesticides | 13PPM | 14PPM | 14PPM | 16PPM | 18PPM | <=15PPM |
| Sample3=Sample with pesticides and activated charcoal | 12PPM | 11PPM | 10PPM | 10PPM | 10PPM | <=15PPM |
| Sample4=Sample with pesticides and limestone | 13PPM | 13PPM | 12PPM | 12PPM | 12PPM | <=15PPM |

Table 4.1 Estimation of lead

Chart 1 shows that the comparison between lead on different days and different samples

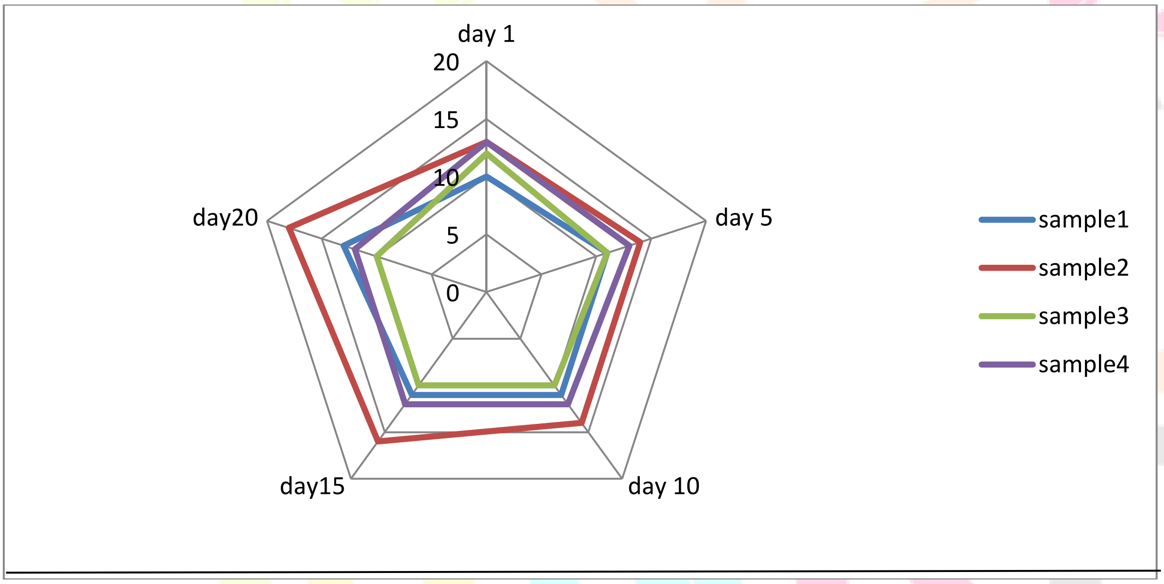


Chart 1 Estimation of lead in each sample

**Tray 1;** that is sample 1 shown from graph as blue color the graph represents the initial concentration of lead in blue tray as 10PPM here lead were not detected, on day 10 there was no increase in concentration than 11PPM, and this increased to 13PPM when the incubation time reached day 20.

**Tray 2;** In the red tray having soil mixed with pesticides, the graph indicated the increase in value of lead concentration from 13PPM on day 1 to 14PPM on day 5. On day 10 to day 20, there was a drastic increase in a lead content from 16 PPM to 18PPM.

**Tray 3;** In the green tray having activated charcoal with soil mixed with pesticide the graph indicate the continuous decrease in value of lead concentration from 12PPM on day 1 to 10PPM on day 5,10,15,20.

**Tray 4;** In the violet tray having limestone with soil mixed with pesticide the graph indicate the continuous decrease in value of lead concentration from 13PPM on day1 to 12PPM on day 20. It represent that limestone activity for removal of lead is low when compared to that of activated charcoal.

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