EFFECT OF ENVIRONMENTAL LEAD ON HUMAN HEALTH

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ABSTRACT

Lead is a abundant metal in nature, occurring in lead mineral. Lead intake is by diet, air and water each day in living beings. This Pb effect the heme synthesis of the blood which causes hematological disruption of respiratory pigments such as cytochromes, anaemia, kidney disfunctioning and brain damage. This can be cured by chelating agents

KEYWORDS: Lead(Pb), toxic, biochemical.

INTRODUCTION

There are lots of chemicals in the environment. Many of these are toxic and the others are non-toxic. The toxic chemicals are discharge industries into air, water and soil. They get into human food chain form the environment. As they enter in the biological system, they disturb the biochemical processes, leading to fatal results. Chemical toxicology is the science that deals with the study of toxic chemicals and their mode of action. Many metals as environmental hazards are essential dietary trace elements required for normal growth and development of animal and human beings. These metals are Al, Sb, As, Ba, Bi, Be, Cd, Co, Cu, Ce, In, Pb, Hg, Mo, Ag, Te, Ti, Sn, Ti, W, U and Zn.

The well known toxic elements As, Pb and Cd are required in the trace quantities for the growth of animals. The so-called biologically intret Al causes different types of diseases

Toxic Chemicals in Air:

As a matter of fact, thousand of chemicals pose the problems of health hazards so that it is necessary to exercise strict control on those which offer the most serious threats during manufacture and handling.

Toxic Chemicals in Water:

A list of toxic trace elements found in natural water and waste water given in Table 1.

Some of these are essential at low levels, serving as nutrients for animals and plants life, but are toxic at higher levels.

The major source of air borne Pb is the combustion of leaded petrol/gasoline. Pb is added in the form of tetra alkyl lead, primarily Pb((CH3)4 and Pb(C2H5)4, together with the scavengers 1,2-dichloroethane and 1,2-dichloroethane. In common with other particulate pollutants, Pb is removed from the atmosphere by wet and dry deposition.

Table 1: Toxic trace elements in natural water and waste water

<table>
<thead>
<tr>
<th>Element</th>
<th>Sources</th>
<th>Effects and Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>Industry, mining, plumbing, coal, gasoline</td>
<td>Toxic (anaemia, kidney disease, nervous disorders, wild-life destroyed</td>
</tr>
</tbody>
</table>
The major biochemical effect of Pb is its interference with heme synthesis, which leads to hematological damage. Pb inhibits several of the key enzymes involved in the overall process of heme synthesis whereby the metabolic intermediates accumulate. One such intermediate is delta-aminolevulinic acid. An important phase of heme synthesis is the conversion of delta-aminolevulinic acid to porphobilinogen.
deposition process. As a result, street dusts and roadside soils become enriched with Pb, concentrations typically of the order 1000-4000 mg kg\(^{-1}\) on busy streets.

It is noted that most of the Pb intake by a typical city dweller is from diet (about 200-300 ug per day), air and water adding a further 10-15 ug per day each. Of this total intake, 200 ug of Pb is excreted while 25 ug is stored in the bones each day.

**RESULTS AND DISCUSSION**

The overall effect is the disruption of the synthesis of haemoglobin as well as other respiratory pigments, such as cytochromes, which require heme. Finally, Pb does not permit utilization of \(O_2\) and glucose for life-sustaining energy production. This interference can be detected as a head level in the blood of about 0.3 ppm. The detection of (I) provides a sensitive test for Pb in the body at higher levels of Pb in the blood (>0.8 ppm) there will be symptoms of anaemia due to the deficiency of haemoglobin. Elevated Pb levels (>0.5-0.8 ppm) in the blood cause kidney dysfunction and finally brain damage.

Due to the chemical analogy of Pb\(^{2+}\) with Ca\(^{2+}\), bones act as repositories for Pb accumulated by the body. Subsequently, this Pb may be remobilized along with phosphates from the bones which exert a toxic effect when transported to soft tissues.

Lead poisoning can be cured by treatment with chelating agents which strongly bind Pb\(^{2+}\). Thus, calcium chelate in solution is fed to the victim of lead poisoning; Pb\(^{2+}\) displaces Ca\(^{2+}\) from the chelate and the resulting Pb\(^{2+}\) chelate is rapidly excreted in the urine.

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