



Soil health and water quality problems by inorganic pollutants and their remedial measures

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ABSTRACT

Inorganic chemical contamination has become a widespread phenomenon and the problem attains greater significance due to its persistence in soil for longer period. The soil is a primary recipient by design or accident of a myriad of waste products and chemicals used in modern society. Every year millions of tons of products from variety of sources – industrial, domestic and agricultural find their way into the world's soils. Once these materials enter the soil, they become part of the biological cycles that affect all forms of life. Soil act as a physical filter by its sieving action, chemical filter by adsorbing and precipitating the chemical substances and a biological filter by decomposing organic materials. But, owing to non-judicious use of manures, fertilizers, pesticides and waste materials into the soils, ground and surface waters get contaminated by excess quantities of nutrients, heavy metals and pollutants. As per an estimate of United Nation Environment Programme (UNEP), 2 billion hectares of land that was once productive has been irreversibly degraded in the past 100 years due to contamination and inaccessibility. Extent of water pollution depends on the solubility of contaminants, size of the contaminants and soil type. Inorganic contaminants such as arsenic, nickel, selenium, zinc, nitrogen and lead are proving quite hazardous for plant and animal health due to bioaccumulation and subsequent biomagnifications in the food web. In order to reduce the impact of inorganic chemical contaminants on human health by preventing their transfer to the food web, there is an urgent need to reduce their transfer to agricultural plants. In view of above facts, an attempt has been made to review the sources of inorganic contaminants, potential hazards and remediation of contamination in the present text.

Keywords: Inorganic chemical contaminants, health hazard, pollutants, amelioration of soil and water

INTRODUCTION

Inorganic chemical contaminants enter into the soil or water either through pedogenic or anthropogenic or both pathways. If parent materials of the soil have higher concentration of heavy metals or pollutants then certainly the developed soils and water bodies of nearby area will have higher concentration of inorganic chemical contaminants. Industrialization, faulty method of waste disposal, faulty agricultural practices, mining of minerals and unscientific drainage of effluents are few important anthropogenic sources of chemical contaminants. The toxicity of inorganic contaminants released into environment every year is now estimated to exceed that from organic and radioactive sources

combined. The greatest problems most likely involve arsenic, lead, mercury, cadmium, nickel, copper, zinc, chromium, molybdenum, manganese, selenium, fluoride and boron (Kabtapendia and Pendas, 1992). To greater and lesser degree, all of these elements are toxic to humans and animals. Cadmium and arsenic are extremely poisonous; lead, mercury, nickel and fluoride are moderately so; boron, copper, manganese and zinc are relatively lower in mammalian toxicity (Moore and Ramamoorthy, 1984). Table 1 provides background information on the uses, sources and effect of some of these elements.

Irrespective of their sources, toxic elements can and do reach the soil, where they become part of the food chain: Soil→ Plant→ Animal→ Human

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