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LEAD (Pb) TOXICITY-A REAL MASQUERADING LETHAL WEAPON FOR ENVIRONMENTAL HAZARDS

Reema Srivastava

Department of Botany, Kanoria PGMA, Mahavideyalaya, Jaipur, Rajasthan
reemam18@yahoo.com

ABSTRACT

In the recent years, search for better quality of life in urban areas has been provoking an increase in urban agriculture. However, this new way of agriculture can bring risks to human health since this land is highly contaminated, due to anthropogenic activities. This way, lead (Pb) phytotoxicity approach must be taken into consideration since it can be prejudicial to human health through food chain. Lead is a silvery-white highly malleable metal. Archeological research indicates that Pb has been used by humans for a variety of purposes for more than 5,000 years. Lead is one of the most widely distributed trace metal. It is ranked second of all hazardous substances by the Agency for Toxic Substances and Disease Registry (ATSDR, 2007). Lead is considered as important potent environmental contaminant. Various ecological, environmental and evolutionary processes in the microsphere are disrupted because of lead toxicity to the microbial community. It is commonly used in fertilizers, batteries, chemicals and ceramics, in different products like pottery, gasoline, lead glass, pesticides, paints, hair dyes, rubber toys and newsprint. Lead is not an essential element for plants and it induced toxicity in plants in terms of their growth, development, and biochemical attributes. Primary effects of Pb toxicity in plants include stunted root growth, probably due to inhibition of cell division in root tips. Even in high concentrations it completely kills the plants.

Keywords: Human health, Urban agriculture, Anthropogenic activities, Phytotoxicity, Hazardous substances

INTRODUCTION

Heavy metal pollution has become one of the most important environmental problems worldwide. Metal pollutants are particularly difficult to remediate from the soil, water and air because, unlike organic pollutants that can be degraded to harmless small molecules, toxic elements, such as lead, mercury, cadmium, copper and zinc, are immutable by biochemical reactions. In the recent years, search for better quality of life in urban areas has been provoking an increase in urban agriculture, however, this way of agriculture, can bring risks to human health since this land is highly contaminated, due to anthropogenic activities. This way, lead (Pb) phytotoxicity approach must be taken into consideration since it can be prejudicial to human health through food chain.

Lead is a silvery-white highly malleable metal. The chemical symbol for lead, Pb, is an abbreviation of the Latin word *plumbum*, meaning soft metal. Archeological research indicates that Pb has been used by humans for a variety of purposes for more than 5,000 years. In fact, archeological discoveries found glazes on prehistoric ceramics. The Egyptians used grounded Pb ore as eyeliner with therapeutic properties and cosmetics Kohl. Pb-based pigments were used as part yellow, red and white paint. In

ancient Rome-lead was used to build pipes for water transportation (Johanson, 1998, Rehren, 2008 and Retief and Caliers, 2005). Apart from the natural weathering processes, Pb contamination of the environment has resulted from mining and smelting activities, Pb containing paints, gasoline and explosives as well as from the disposal of municipal sewage sludge enriched in Pb (Chaney and Ryan, 1994). Despite regulatory measures adopted in many countries to limit Pb input in the environment, it continues to be one of the most serious global environmental and human hazards. As many of the Pb-pollutants are indispensable for modern human life, soil contamination with Pb is not likely to decrease in the near future (Yang et al, 2000).

Pb is considered a general protoplasmic poison, which is cumulative, slow acting and subtle. Soils contaminated with Pb cause sharp decreases in crop productivity thereby posing a serious problem for agriculture (Johanson and Eaton, 1980).

Sources of Lead

Lead is one of the most widely distributed trace metals. It is ranked second of all the hazardous substances by the Agency for Toxic Substances and Disease Registry (ATSDR, 2007). Lead is considered