

# Cadmium Toxicity Impact On Aquatic Organisms- Oxidative Stress: Implications For Human Health, Safety And Environmental Aspects-A Review

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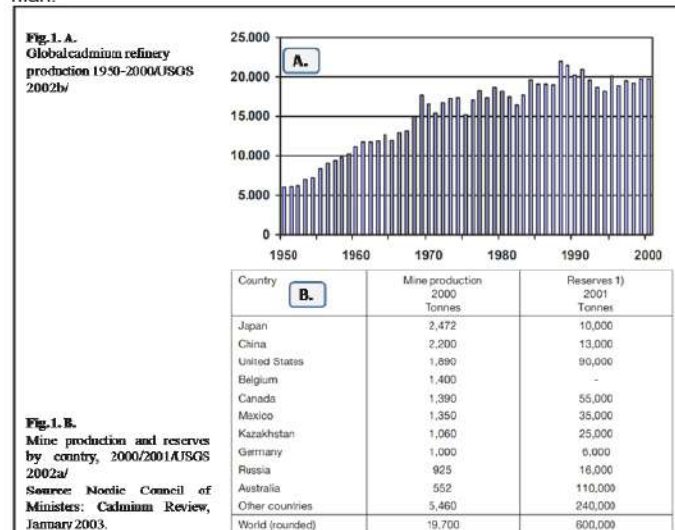
**Abstract:** Man and the biosphere are presently under an increasing risk of heavy metal pollution. Cadmium (Cd), in meticulous, is extremely toxic to humans as well as aquatic organisms. Cd flow to humans is more through aquatic meat. Throughout the world cadmium and cadmium compounds are regulated in the workplace and in the market place. Metal toxicity in various animal species has been well documented; however, their combined action in the regulation of metal stress has never been reviewed yet. Therefore, this review examined the important health, safety and environmental issues associated with the use and disposal of cadmium compounds. Cadmium (Cd) has been in industrial use for a long period of time. Its severe toxicity stimulated into scientific focus throughout the middle of the last century. It is necessary to investigate their toxicity and potential hazards to human and aquatic ecosystems. In this review, we conferred significant and modern developments of toxicological and epidemiological difficulty, including elucidation sources, toxic effects, particularly the acute toxicity and chronic ones, induced by Cadmium in aquatic animals and how it reached through food chain to higher mammals. The toxic effects of selected metal cadmium, as well as the underlying mechanisms of cadmium causing these effects, are also highlighted and described in detail. In addition to acute effects such as mortality, chronic exposure to cadmium can lead to adverse effects on growth, reproduction, immune and endocrine systems, development, and behavior in aquatic organisms.

**Keywords:** Cadmium toxicity, Food web, Human and Environmental health safety.

## 1. INTRODUCTION

Environmental problems have increased exponentially in recent decades mainly because of rapid growth in human population and increased demand for several household materials [1]. Water is essential constituent of life support system and its quality play pivotal role in the maintenance of health [2]. Industrial effluents including toxic metal compounds are major source of water pollution besides sewage, agricultural discharges and other household residues [3], [4]. Heavy metals are important environmental pollutants and their toxicity is a problem of increasing significance for ecological, evolutionary, nutritional and environmental reasons [5]. Threatening effect of metals is a serious problem which is increasing at an alarming rate all over the world [6]. Heavy metal poisoning is believed to interfere with metabolic pathways in vital organs through different mechanisms in living organisms. It is believed that metals may exert their effects directly by interfering with endocrine system and/or they may alter many metabolic body processes. However, the study related to the understanding the mechanism of action of toxic metals on vital organs is still at its infancy.

The contamination of fresh waters with a wide range of pollutants has become a matter of concern over the few decades [7]. Natural aquatic resources are extensively contaminated with heavy metals like lead (Pb), cadmium (Cd), nickel (Ni) and copper (Cu) released from domestic, industrial and other man made activities. Among the heavy metals, Cd is one of the most toxic, non-essential heavy metal; known for its corrosive nature and is widely used in paints and dyes, cement and phosphate fertilizers [8]. Cd occurs naturally in the environment in significant amounts but its release in the recent past is steadily increasing due to human activities causing pollution at considerably toxic amounts was reported by earlier workers in various aquatic ecosystems [9]. In aquatic systems, as fish occupy the upper trophic level, there are greater chances of transferring Cd to higher organisms particularly to man.



**Fig.1. Statistical data of global cadmium refinery production, mine production and reserves by country [10].**

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