



Aluminium aquatic poisoning: the hide and seek danger beneath the aquatic animal

G.Kondaiah^{1*}, U. Srineetha²,

¹Research Scholar, Department of Zoology, Government Degree college for Men (A), Kadapa, (Affiliated to Yogi Vemana University, Kadapa), Andhra Pradesh, India.

²Lecturer in Zoology, Government Degree college for Women, Pulivendula, (Affiliated to Yogi Vemana University, Kadapa), Andhra Pradesh, India.

doi.org/10.5281/Fishworld.12980593

Abstract

Aluminium poisoning is one of the most serious hazards to aquatic ecosystems. The functioning of aquatic ecosystems may be adversely impacted by this phenomenon, which is brought on by the aquatic surface water absorbing more aluminium metal. It is established that water pollution causes changes in the physiological and chemical. The present article discusses the sources, causes, and impacts of aluminium poisoning.

Keywords: Aluminium poisoning, physio-chemical characteristics, fish, human health.

1. INTRODUCTION:

An aquatic ecosystem is defined as a major unit of ecological function, comprising aquatic organisms with a specific water area. These aquatic organisms interact with their environment, maintaining a dynamic equilibrium.

Aluminium poisoning is one of the most serious hazards to aquatic ecosystems. The functioning of aquatic ecosystems may be adversely impacted by this phenomenon, which is brought on by the aquatic surface water absorbing more aluminium metal. Aluminium enters the aquatic ecosystem through natural and antropogenic sources. Aluminium poisoning is one of the most serious hazards to aquatic ecosystems. The functioning of aquatic ecosystems may be adversely impacted by this phenomenon, which is brought on by the aquatic surface water absorbing more aluminium metal

Today, food habits are rapidly changing around the world, and fish eating may threaten human health through aluminium pollutants. Generally, Aluminium poisoning

is one of the most serious hazards to aquatic ecosystems. The functioning of aquatic ecosystems may be adversely impacted by this phenomenon, which is brought on by the aquatic surface water absorbing more aluminium metal

Sources of aluminium poisoning:

A. Aluminium processing industries:

Different industries are processing aluminium all over the world, releasing aluminium metal pollutants into the aquatic environment. After this, pollutants are enter the aquatic water, which increases the toxicity.

B. Disposal of aluminium waste:

The pH level of aquatic water is affected by aluminium waste disposal, which leads to poisoning in the marine environment.

C. Agricultural land:

Through soil erosion and precipitation, the chemicals found in pesticides and fertilizers find their way into the ocean. These agricultural activities are the main cause of the aluminium poisoning.

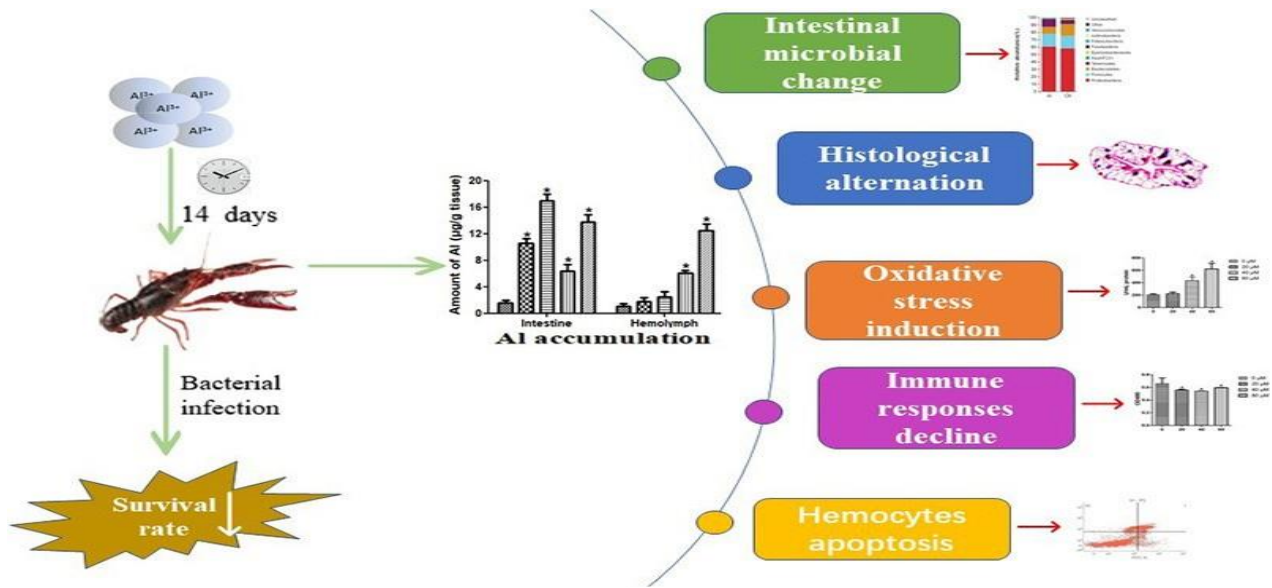


Fig. 2. Aluminium exposure to crustacean animal

D. Mining:

Aluminium metal refining transforms bauxite ore into alumina (Al_2O_3). Bauxite is mined through fairly strip mining; the extensive and uncontrolled mining impacts the aquatic health and lives of people.

➤ **Crustaceans:**

Different crustacean animals, such as prawns, crabs, and crayfish, etc., are affected by aluminium poisoning through the contamination of aquatic water.

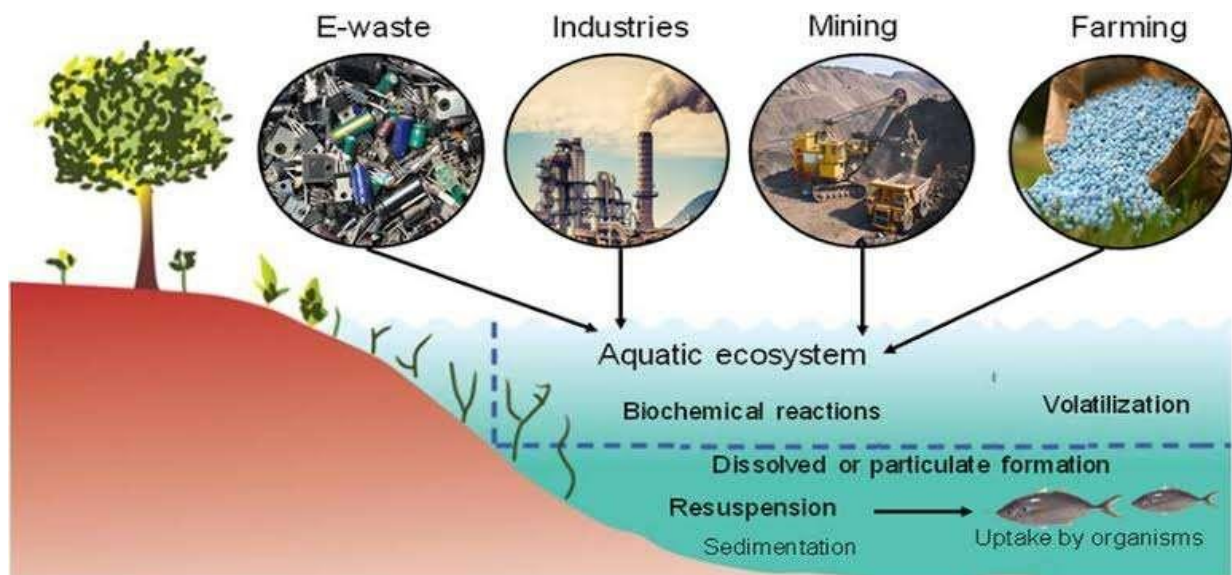


Fig. 1. Sources of aluminium metal

2. Effects of aluminium poisoning on aquatic ecosystem animals:

➤ **Fish:**

The aluminium poisoning phenomenon affects the different organs in the fish, such as the brain, gills, liver, and kidneys. Clinical symptoms are gill filament necrosis, hepatic necrosis, and parenchymal haemorrhage.

response decline, and hemocyte apoptosis.

➤ **Zooplanktons:**

These constitute significant food items for planktivorous and pelagic fish. Zooplankton play a major role in enhancing the biomagnification of aluminium metal across the food chain for higher aquatic animals.

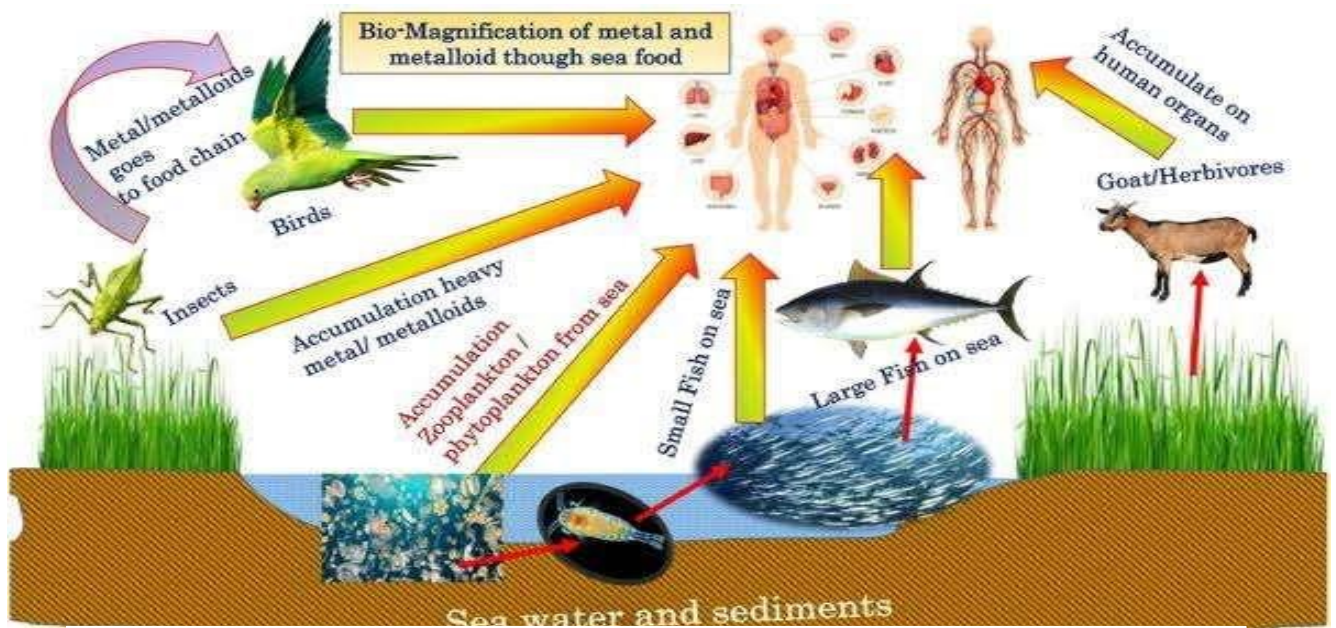


Fig. 3. Bioaccumulation in an Aquatic Ecosystem

➤ **Human beings :**

Aluminium metal can be dreadful to human beings. This metal intake is caused by airborne particles, drinking water, food, and pharmaceuticals. Generally, aluminium poisoning affects different

body organs, such as the brain, muscles, heart, bone, liver, and kidney. This metal causes Severe acute toxicity is Alzheimer's disease (AD) in the brain.

3. Conclusion:

An aquatic ecosystem, whether ocean, freshwater, or estuarine, needs fish and other aquatic fauna to be protected from being contaminated with aluminium metal. Environmental and health risks from aluminium metal toxicity are serious issues to be addressed worldwide.

Proper monitoring and raising awareness among the public in this regard.

Reference:

Alwan SF. 2012. Histopathological changes in gills, liver and kidney of freshwater fish, *Tilapia zillii*, exposed to aluminium. Research Article,3(11):2071-2081

Agbugui, M. O., Oniye, S. J., Auta, J. and Abeke, F. O. (2011). Growth performance and feed utilization of fingerlings of *Clarias gariepinus* (Teguels) fed processed *Pauletia monandra* (Kurz) seed meal. Journal of Aquatic Sciences, 26 (1): 21-27.

Galicioli, M.E.A.; Silva, J.F.; Prodocimo,

M.M.; Laureano, H.A.; Calado, S.L.d.M.; Oliveira, C.S.; Guiloski, I.C. Toxicological Effects of Thimerosal and Aluminum in the Liver, Kidney, and Brain of Zebrafish (*Danio rerio*). *Metabolites* 2023, 13, 975.

Hadi AA, and Alwan SF. 2012. Histopathological changes in gills, liver and kidney of freshwater fish, *Tilapia zillii*, exposed to aluminium. Research Article,3(11):2071-2081