

Investigation Effects Environmental Pollution on Aquatic Life

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Abstract: Environmental pollutants, agricultural and industrial waste, emissions or pollution, the aquatic or terrestrial environment pouring also defined as chemicals from treated and untreated sewage. These toxic substances by interfering with the endocrine system of humans and animals physiology, endocrinology and general impact on the health aspects are different. The two most important groups of these substances, heavy metals and pesticides creates. Need the protection of human health and nutrition in terms of both the economic benefits of pesticides, due to its resistance to degradation of natural water, soil and air pollution causes and ecological systems are destabilized. While the majority of pesticides effective for target organisms, human and non-target harm to other living things are. Especially, resistant to natural degradation and soluble in fatty tissue organochlorine pesticides, harmful to all living things accumulate in my biyoekosiste can reach levels. Nature, intentionally or unintentionally discarded chemicals, industrial waste resulting from the mixture of chemical pollution is pollution. The chemicals currently regarded as an impurity of heavy metal contamination can arise from various sources be resistant to environmental conditions and can easily enter the food chain due to their *in vivo* accumulate with increasing concentrations of other chemical pollutants are in the first place. Studies indicate that water contaminated by environmental pollutants. Investigation of pesticides and heavy metals in water level will give us information on environmental pollution rights.

Key words: Pesticide, heavy metals, aquatic life, environmental pollution, fatty tissue

INTRODUCTION

Water pollution causes harms to human beings, aquatic flora and fauna. It is the deterioration of physical, chemical and biological characteristics of water due to disruptions by human and any other source. Some of the important sources of water pollution are industrial effluents, agricultural effluents, domestic effluents and sewage, radioactive wastes, thermal pollution and oil pollution.

Human activities like deforestation burning fossil fuel altering environmental systems in whole world (Kanu, 2015). Pollution of waters effects aquatic organisms since their existence depend on water quality. Usually, polluted water is abundant with algae resulting depletion in oxygen level and causing death of nektons and planktons. Many cases related to the destruction of aquatic life have been reported caused by pollution. It is estimated that during the last two decades, there has been a decrease of about 40% in aquatic life such as mass killing of fish. Toxic chemical substances have different impacts on the physiology of living organisms by interfering with the endocrine system of humans and animals. Industry with

many contaminant chemicals in line with developments has negative effects on the field of agriculture and animal husbandry by causing pollution in livestock drinking water, lakes, rivers and soil and the atmosphere.

Although, increasing number of Rare Earth Elements (REEs) in the past decade has been induced by their wider applications in industry including electronics and high technology, the most known two important groups of these substances are heavy metals and pesticides (Migaszewski and Galuszka, 2015). Heavy metals and pesticides hold an important place in pollution of aquatic environments.

Kunhikrishnan *et al.* (2015) reported that Engineered Nanomaterials (ENM) have been used in production industry and like the other technological developments they have both benefits and risks. The more use of ENM in consumer products, the more waste of these nanomaterials enter to waters. It is estimated at 500 and 50,000 tons silver and Titanium Dioxide (TiO₂) annual production, respectively.

Pesticides which has some economic importance with respect to protect human health and to provide food security, cause water and soil pollution due to their

resistance to natural decomposition resulting destabilization of aquatic ecosystems. While the majority of pesticides effective for target organisms, they harmful also for human and non-target living creatures. Especially, pesticides with organochlorine, resistant to natural degradation and soluble in fat tissues, accumulate in many ecosystems and become toxic to aquatic environments. All the chemicals drained into the water sources have harmful effects on every organism that lives there. If the amount of pollutants is so high in the water, growth of aquatic vegetation is retarded due to low photosynthesis rate.

MATERIALS AND METHODS

The effects of the pesticides on aquatic life: Apart from above mentioned direct effects of water pollution, there are many indirect effects also that threat to the ecosystem and an important cause of environmental degradation.

Swarup and Patra (2005) reported that pesticide toxicity, plumbism or lead poisoning, mercury poisoning and fluorosis are some of the commonly encountered overt toxic problems due to pollution in domestic animals. Exposure to low levels of pollutants cause chemical residues in animal system and create subtle or subclinical effects such as oxidative stress, immunotoxicity, carcinogenicity, teratogenicity and endocrine disruption. Pollution effects adversely also wild animals in the way of their domestic counterparts. It has been reported that there were eggshell thinning in birds of prey due to DDT residues and heavy mortality amongst fish and birds due to contamination of aquatic ecosystem with mercury, oil spills or acid rains.

Pesticide toxicity is a serious threat to both people and wildlife. Some of the pesticides caused mutations and had carcinogenic effects on nervous system. Synthetic pyrethroids and pesticides such as deltamethrin, fenvalarate, cypermethrin are widely used but adversely affect the aquatic environment to a great extent (Elliott *et al.*, 1974; Armella *et al.*, 1987; Santhakumar *et al.*, 1999).

The physiological and chemical properties of fish blood are very sensitive to environmental changes (Hughes and Nemcsok, 1988). It is reported that exposure of rainbow trout to sublethal concentrations of the pesticide cypermethrin caused increases in red blood cells, hemoglobin concentration, mean corpuscular hemoglobin, mean corpuscular hemoglobin concentration, thrombocyte count and erythrocyte sedimentation rate (Atamanalp *et al.*, 2002). Chronic exposure to lower amounts of pesticides causes negative effects on many biological systems including acute poisoning. The

negative effects of pesticides on the immune and endocrine system, reproductive and overall growth have been reported by Akar and Kynyk.

Effects of heavy metals on aquatic life: Heavy metals enter the aquatic environments in various ways and become toxic to aquatic organisms by changing water quality parameters such as pH and oxygen level. They accumulate in body of aquatic organisms in the aquatic food chain and can be transferred from one organism to another by predator consumption. Feeding habits of the species, body size, life span and duration of the exposure are the main factors affecting the uptake of metals from food. Surface adsorption is also considered as a form of metal 'uptake' which increases at high pH. It is shown that the toxicity of Cd, Fe, Zn and Pb increases at low pH, in some invertebrates (Gerhardt, 1993). Gerhardt (1993) reported that the influence of pH on metal speciation was decreasing in the following order: Cu>Pb>Cd>Zn in stream invertebrates. Toxicity of Cd, Fe, Zn and Pb increases at low pH, however not for all invertebrates.

Heavy metals such as Cu, Fe, Zn, Pb, Hg, Co, Mn, Cr, Se, Ni and Cd are among the most persistent of pollutants in aquatic systems due to their resistance to decomposition in nature. They accumulate in liver, kidney and some other tissues such as the brain and can create serious health problems for animals and humans (Beyaztas *et al.*, 2008). It is reported that Cd caused CA enzyme inhibitions in erythrocytes, gills, livers and kidneys (Bektas *et al.*, 2008).

By continuous absorption and absorption of trace elements from waters via digestive system and gills the accumulation level of them in aquatic animals can be higher hundreds of times than that of found in waters. It is reported that mercury can be stored at lethal levels in the body of aquatic animals and causes deaths. Although, trace elements such as copper, iron, zinc, manganese, iodine, cobalt, selenium and chromium are needed for the physiological process of mammals and fish, high concentrations of them even in a certain cell or tissue causes impairments of physiological functions in the body. Copper and zinc accumulate primarily in organs with high metabolic activities and by blocking active site of the enzyme causes toxicity in the organism.

RESULTS AND DISCUSSION

Pesticides have been used in agriculture for the production of cotton, corn, sugar cane, oil plants and legumes in the control of pests and then introduced to the aquatic ecosystem by draining waters. Active ingredients of powder or granulated chemicals remain suspended in

waters and therefore aquatic organisms get a prolonged exposure to them. They penetrate from soil to groundwater and passes to water sources resulting residues to a toxic level. Finally, fish and other aquatic creatures get a big risk by living next to such dangerous environments (Arias-Estevez *et al.*, 2008).

CONCLUSION

At the same time, the pesticide and heavy metal levels in aquatic organisms to investigate the potential risk factors are also important in terms of revealing.

RECOMMENDATIONS

Future studies should be done with experiments in artificial streams or in the field instead of short term tests and simple recording of field data.

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