

Study the Amount of Metals and Heavy Metals as the Pollutants of Environment in Persian Gulf Seashores

HABIBEH ZARE

Department of Biology Payamenoor University;
Department of Biology Shiraz University (Iran).
E-mail: zare31338@yahoo.com

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ABSTRACT

What is the pollution?

We can define the pollution as an undesirable change in physical, chemical and biological properties of the climate or the earth. These changes endanger health, survival and activities of the human beings and the creatures.

The chemical substances resulting from industrial complexes or domestic sewages can enter the seawater and they may be harmful to the human being and creatures living around.

Kinds of pollution

We can recognize two kinds of pollutants biologically: declinable and staying. (permanent and temporary)

Declinable pollutants can be decreased during natural processes through engineering methods like the refinement of sewage water as long as the system is not polluted completely. Declinable pollutants that enter the seawater like human sewage, animal and agricultural additional can be disintegrated quickly.

The permanent pollutants are not disintegrated naturally including heavy metals like lead, mercury, cadmium, Nickel and metals like Aluminum and their entering into seawater should be prevented.

In present study, we consider the rate of heavy metals in Persian Gulf.

Key words: Metals and heavy metals, Persian gulf, Environment.

INTRODUCTION

The pollution phenomena are mainly the result of technology development, especially in this century and it is related to political, economic and social issues.

Today heavy metals are important ecologically and biologically because they are poisonous and lasting and they gather in animal tissues. Heavy metals are naturally in the earth crust and the human being increases these metals in the environment through urban, industrial and agricultural sewages.

Lead and cadmium are dangerous heavy metals. Exploration of the effects of heavy metals

can cause development of food chains and ecosystems in order to measure the amount of pollutants in different organisms. (burger)

After heavy metals and other metals enter into the seawater, they gather in fish and shrimp's body, and then they enter in people's nutrition in the province and the country. When these metals gather in body, they can cause cancer and dangerous diseases.

Touching with xenobiotics including drugs and environment pollutants are increasing. Rachel Carson summarizes this situation in a phrase: "chemicals are like a rough weapon or a cave man's club that their goal is the body of life."

The human being is exposed to thousands of xenobiotic. (xenos means alien). An exotic is a combination that enters into body from out. Main groups of xenobiotics including drugs, cancerous materials and heavy metals enter into the environment in some way.

Xenobiotics are called procarcinogen

The reactions of the human's body to xenobiotics lead to increasing biologic activity or becoming poisonous.

Persian Gulf is the most important source of sea foods like fish and shrimps in Iran. The water of Persian Gulf has been polluted by heavy metals like lead, Cadmium, Copper, Zinc. Because of wrong management and pouring domestic and industrial sewages into the seawater.

That's why we examine the amount of heavy metals and non-heavy metals like lead, nickel, cadmium, zinc, copper, Aluminum in Persian Gulf in Bushehr province. After that we compare the amount of these elements with international standards in order to suggest suitable approaches to stop polluting seawater by sewage.

"The sub lethal influences of heavy metals"

We can explore the responses of the creatures to sub lethal density.

Sub lethal responses are very different but it may conclude the kinds of physiologic pressures, tumors or progressing disorders that will lead to untimely death.

We observe spoiling fish fin or precancerous growth on ventral surface of wide fish which reside in very pollutant area.

This response is not specific and we can observe mentioned effects if there will be in slim of Dioxide titanium or in the oil.

Eating crude oil particles by Herring Gulls and sea birds cause damages in their liver and intestine and change their gland's function.

Four stations were chosen in different intervals in Persian Gulf beaches in Bushehr. The

sample of water was got from each station.

Sampling performed by the capped polyethylene containers which it was washed with solution of nitric acid and distilled water.

MATERIAL AND METHODS

Water samples were immediately filtered in one-liter polyethylene containers by filter papers at the same place and it was added 2 mili-liters dense nitric acid in order to fix them.

In the laboratory they heated the water to sub-boiling point by water-bath, so that its volume turned into 20 ml.

The prepared samples were put in 30 falcons and transferred to the chemistry department in Shiraz university.

The heavy elements in the samples were measured by ICP(Inductive Couple Plasma). The model of this system is Vista Brue. An inductively coupled plasma (ICP) is a type of plasma source in which the energy is supplied by electric currents which are produced by electromagnetic induction, that is, by time-varying magnetic fields¹.

Operation

There are two types of ICP geometries: planar and cylindrical. In planar geometry, the electrode is a coil of flat metal wound like a spiral. In cylindrical geometry, it is like a helical spring.

When a time-varying electric current is passed through the coil, it creates a time varying magnetic field around it, which in turn induces azimuthal electric currents in the rarefied gas, leading to break down and formation of a plasma. Argon is one example of a commonly used rarefied gas.

Plasma temperatures can range between 6 000 K and 10 000 K, comparable to the surface of the sun.

ICP discharges are of relatively high electron density, on the order of 10^{15} cm^{-3} .

As a result, ICP discharges have wide applications where a high density plasma is necessary.

Another benefit of ICP discharges is that they are relatively free of contamination because the electrodes are completely outside the reaction chamber. In a capacitively coupled plasma (CCP),

in contrast, the electrodes are often placed inside the reactor and are thus exposed to the plasma and subsequent reactive chemical species.

RESULTS

The average of the rate of heavy metals at different station in Persian Gulf is like below.

Table 1: The average of the rate of heavy metals at station number 1 in Persian Gulf. Bushehr

Metal Station	Zn PPM	cu PPM	Ag PPM	Cd PPM	Co PPM	Ni PPM	Al PPM	Pb PPM
Station 1	0.4102	0.2417	0.1774	0.0225	0.0995	0.1840	2.9468	0.2333

Table 2: The average of the rate of heavy metals at station number 2 in Persian Gulf. Bushehr

Metal Station	Zn	Cu	Ag	Cd	Co	Ni	Al	Pb
Station 2	72.030	0.2417	0.1764	0.0064	0.0666	1.5126	197.51	2.7731

Table 3: The average of the rate of heavy metals at station number 3 in Persian Gulf. Bushehr

Metal Station	Zn	Cu	Ag	Cd	Co	Ni	Al	Pb
Station 3	0.6747	0.2293	0.0881	0.0097	0.0030	0.111	3.5976	0.6747

Table 4: The average of the rate of heavy metals at station number 4 in Persian Gulf. Bushehr

Metal Station	Zn	Cu	Ag	Cd	Co	Ni	Al	Pb
Station 4	1.5939	1.5695	0.5129	0.0191	0.4546	72.898	10.5669	0.2404

Table 5: The average of the rate of heavy metals at sea water

Concentration(PPM)	Aria	Kind of Metal
0.0025	Pacific Ocean	Ag
0.864	Atlantic Ocean	Aluminium
0.118	Pacific Ocean	Cadmium
0.007	Pacific Ocean	Cobalt
0.146	Arctic Ocean	Cu
0.241	Arctic Ocean	Nickle(Ni)
0.64	: Atlantic Ocean	Zn
0.014	Pacific Ocean	Pb

DISCUSSION

We show the result of measuring metals and heavy metals in Persian Gulf seashores of Bushehr province at the result part of the table.

Comparing obtained amounts with standard rate of WHO [4] shows that Persian Gulf in Bushehr area from the point of metals and heavy metals is polluted and this pollution enters food chain of fish and shrimps which are much in demand food of the region people.

The examination shows that the pollution can be resulted of activities of weaving factory and entering home and industrial sewages to the sea water.

Using the polluted water by fish and shrimps cause settling the metals in animal tissues and when the human consumes the sea foods especially fish, the metal settles in human's tissues.

The existents of heavy metals in sea water involves the aquatics in problems.

The most rate of pollution is related to station 2 where the sewage of weaving factory and home sewages are poured into the seawater and this pollution is related to aluminum.

At present time the human beings provide at least 40 percent of his needful portion by breeding the aquatics like fish and this number will reach to 60% in future.

The rate of fishing and producing fish is 40 million tons per year in the world and today fish provide a noticeable portion of human protein.

Regarding our population in Bushehr province, entering urban and home sewages into Persian Gulf is growing immediately. Pollution of the Persian Gulf and endangering environment on one part and rushing red killing seaweeds on the other hand risk the soundness (health) of environment in Persian Gulf.

The most amount of pollution is related to

aluminum that measured at station 2. It's 197.5180 PPM and in comparison with north atlas ocean (0.218 to .678 mg/h) is so much.

We should find the reasons and prevent entering home and factories sewage to sea water.

The rate of aluminum at station (4) is equal to 10.56569 PPM.

After aluminum, the most rate of metal in the Persian Gulf seashore is related to nickel at station (4) which equals to 72.8998 PPM.

The maximum rate is related to zinc that is equal to 72.0303 PPM.

The minimum rate of metals in Persian Gulf seashores is related to station 1. Where the rate of aluminum is 2.9468 PPM. This is the minimum rate among 4 stations. And the rate of Nickel is equal to 0.1840 PPM.

The element of copper with 40.4431 PPM at station 2 has the maximum rate among 4 stations. Station no, 1 0.2417 PPM Station No, 3 0.2293 PPM and station No, 4 with density of 0.2293 PPM are definitely less.

Suggestion

It's offered that the procedure (process) of irregular increasing entrance of home and industry and hospital sewages into Bushehr seashores in Persian Gulf to be examined (Considered) and sewages entrance into seawater should be prevented.

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