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Qualitative Analysis of Vegetables Irrigated by Fresh Water and by Contaminated Water, Chandragupta Mourya Square, Indore

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Abstract

Metal were very important content only for little amount but at high concentration they show toxic effects. Toxic pollution comes from heavy metals, such as Lead ,Cadmium , Sulphate , Nitrate ,Nitrite , Fluoride, Cyanide, Phosphate ,Ammonium were may present in vegetables irrigated by contaminated water . They also affect on environment (Human beings, Animals and Plant).The effect of Non-metals like fluorides, shulphate, nitrite, chlorides are also studied. The study is taken for knowing the metals and non metals contents in contaminated water and vegetables irrigated by that water. The study is aimed at investigating metals and non metals are present in contaminated water and vegetables and its effect on health.

Keywords: Environment, Contamination, Chloride, Lead and Vegetables

Introduction

Water contamination is term used to describe hazardous material of any kind, which is polluting sources of water. Contamination may include Organic and Inorganic substance. Water pollution is a major global problem.

The ill-effects of water pollution on humans and animals are a matter a concern. It is like a slow poison which slowly and gradually affects the aquatic ecosystem, it is plants, animals and human body adversely different types of chemicals and microbial pollutant affect humans and animals in different ways. Various consequences of water pollution on humans include.

Toxic pollution comes from heavy metals, such as Lead, Cadmium, Mercury, Zinc, Nickel act as micro nutrients at lower concentration, they become Toxic at higher concentration.

Metals Lead, Arsenic, Copper, Iron and non Metals Chloride, Sulphate, Nitrate, Nitrite, Fluoride, Cyanide, Phosphate, Ammonium were may present in vegetables irrigated by contaminated water (near the bank of Khan River of Indore, India). They also affect on environment, human beings, animals and plants.

Dissolution and transport of metals and heavy metals by run-off and ground water is another example of environment problems with mining.

Water is the important input to fertilizer for crop production. If water is polluted, it is dangerous for plants, animals as well as for human beings. If heavy metals contaminated water is used for irrigation, it is create hazard both in soil, environment and crop quality. Twenty percent loss of crop production is observed due to high concentration (20 ppm) of heavy metals[1]. Heavy

metals are toxic to plant and its discharge into the environment must be carefully controlled and minimized.

Food safety issues and potential health risks make this as one of the most serious environment concerns. Vegetables are important food crops which are very essential for maintaining good health. 80% water contain present in the vegetables[2]. Therefore, it is most importance to determine the metals content in vegetables. Very limited work has been done on the effects of using metals contaminated water on crop production and it is effect on food chain.

Heavy metals through contaminated vegetables may lead to various chronic diseases. Bio-toxic effects of heavy metals depend upon the concentration and oxidation states of heavy metals, kind of sources and mode of deposition. Severe exposure of Cd may result in pulmonary effect such as emphysema, bronchiolitis and alveolitis. Renal effects may also result due to sub chronic inhalation of Cd, Pd toxic causes reduction in the hemoglobin synthesis, disturbance in the functioning of kidney, joints, reproduction and cardiovascular system and chronic damage to the central nevous system. Concentration of Zn can causes impairment of growth and reproduction.

Pollution matters harm the environment on which people depend. The environment is not something distant and separate from our lives. It is not a pretty shoreline hundreds of miles from our homes or a wilderness landscape that we see only on Television the environment is everything that surrounds us life and health.

A Study of Arsenic Contaminated Irrigation Water and its Carried over Effect on Vegetable was studied by Farid et al [1].High levels of microbial contamination of vegetables irrigated with wastewater by the drip method was studied by Sadovski et al [2.] Vegetables can absorb heavy metals from contaminated irrigation was studied by Stasinos et al[3] Comparison of proximate and heavy metal content of vegetables grown with fresh and wastewater was studied by Rehman et al[4.]

Microbial Contamination in Vegetables at the Farm Gate Due to Irrigation with Wastewater in the Tamale Metropolis of Northern Ghana was studied by Cobbina et al[5].Concentration of mercury, lead, chromium, cadmium, arsenic and aluminum in irrigation water wells and wastewater used for agriculture in Mashhad, northeastern Iran was studied by Mousavi SR et al[6].

Hazards of heavy metal contamination were studied by Jarup L et al[7].Heavy metal accumulation in vegetables grown in a long term waste water irrigated agricultural land of tropical India was studied by Gupta et al[8].Impact on crop quality from irrigation with water reclaimed from sewage was studied by Unkovich et al[9.]

Effect of Cadmium, Copper, Lead, and Zinc Contamination on Metal Accumulation by Safflower and Wheat was studied by Sayyad et al[10.] Arsenic contaminated in Food-chain: Transfer of arsenic into food materials through groundwater irrigation was studied by Lmamul et al[11.] Removal of heavy metal ions in wastewater by semnan natural zeolite was studied by Mousavi et al[12].

Determination of cyanide and nitrate concentrations in drinking, irrigation and wastewaters was studied by Mousavi et al[13] A systematic review on status of lead pollution and toxicity in Iran; Guidance for preventive measures was studied by Karrari et al[14.] Consumption of unsafe food in the adjacent area of Hazaribag tannery campus and heavy metals contaminated was studied by Islam et al[15].

Materials and Methods

All chemicals and materials will be taken of AR-grade. Irrigated vegetables by fresh water and contaminated water (polluted vegetables) will be find out in different places near the bank of Khan River in Indore, India. Metals and non-metals are determined by the tests provided in the book written by Gharia[16].

The procedure for the test of metallic contaminations (metal)-Lead, Arsenic, Copper, Iron. Non- metallic contaminations (non metal) – Chloride, Sulphate, Nitrite, Fluoride, Cyanide, Phosphate, Ammonium etc will be determined with the help of reported methods.[16]

Results and Discussion

The studied area was Chandragupta Mourya Square, Indore and Vegetables taken is Spinach.

Following tables were as follows for metal and non metal contaminations in different vegetables:

In Table-1 Non-metals Contaminations (contaminated water and vegetables)-All seven non-metals are present in water and vegetable (Spinach).

In Table-1 Non-metallic contaminations (Fresh water and vegetables) – all Non-metals are absent in water and Spinach.

In Table-2 Metallic contaminations (contaminated water and vegetables) Lead is absent but Arsenic, Copper and Iron are Present water and Spinach.

In Table -2 Metallic contaminations (Fresh water and vegetables) Lead, Arsenic are absent in water and Spinach, Copper is absent in water but present in spinach and Iron present in Spinach and absent in water.

Table 1. Non-metallic Contaminations (Vegetable:-Spinach)

Non-metals	Contaminated Water	Fresh water	Vegetable (Spinach) Irrigated by Contaminated water	Vegetables(Spinach) irrigated by fresh water
Chloride	Present	absent	Present	Absent
Sulphate	Present	absent	Present	Absent
Nitrite	Present	absent	Present	Absent
Nitrate	Present	absent	Present	Absent
Fluoride	Present	absent	Present	Absent
Phosphate	Present	absent	Present	Absent
Ammonium	Present	absent	Present	Absent

Table 2. Metallic contaminations (Vegetable:-Spinach)

Metals	Contaminated Water	Fresh water	Vegetable (Spinach) Irrigated by Contaminated water	Vegetables (Spinach) irrigated by fresh water
Lead	Absent	Absent	Absent	Absent
Arsenic	Present	Absent	Present	Absent
Copper	Present	Absent	Present	Present
Iron	Present	Absent	Present	Present

Figure.1 study area of Chandragupta Mourya Square, Indore

Some essential element (An essential nutrient is a nutrient required for normal physiological function that cannot be synthesized by the body and thus must be obtained from a dietary source.) are present in irrigated vegetables by fresh water. e.g. Calcium, Phosphorus, Potassium, Copper, Sulphur, Magnesium, Manganese, zinc, boron, Chlorine, Molybdenum, Cobalt, Sodium, Silicon, Iron, Arsenic, and Chloride are supplied to plants by the soil and water. All are necessary of life.

The results showed that Fluoride (non- metal) and Copper, Iron, and Lead (metal)are present in vegetables irrigated by fresh water but they are present in small amount. They are not side effects of our health.

Transfer of non-metals (Chloride, Sulphate, Nitrite, Nitrate, Fluoride, Phosphate, and Ammonium)and metals (Lead, Arsenic, Copper, and Iron) from contaminated water to vegetables. If non-metals and metal are present excess amount in water so this water is called contaminated water. This contaminated water is used for irrigating vegetables. It is very harmful for plants, animals as well as for human being.

Effect of Non-metals

Chloride

Too little chloride in the body can occur when your body loses a lot of fluids. This may be due to excessive sweating, vomiting, or diarrhoea.

Sulphate

Sulphate is one of the least toxic anions. Excess sulphate in the blood is rapidly eliminated by urinary excretion, although some may be excreted in the bile and pancreatic fluid as well.

Nitrate and nitrite

Nitrates are relatively harmless, until they are converted into nitrites inside our body. Ingesting to many nitrites can cause ill effects such as a anemic-like disorder as well as cancer.

Fluoride

Fluoride is a highly toxic substance. Its more toxic than lead, but slightly less toxic than arsenic. Fluoridated water can cause serious poisoning incident, including death.

Ammonium

Ammonium hydroxide is affected kidney and liver, our digestive system.

Effect of Metals

Lead

Lead is very toxic to many organs and tissues including the heart, bones intestines, kidney and reproductive and nervous system.

Arsenic

Arsenic is very toxic for human. Chromosomal abnormalities have been seen with the exposure of human leukocytes or cutaneous fibroblcests.

Copper

Copper toxicity, also called copperiedus, refers to the consequence of an excess of copper in the body. Copper in drinking water, as a side- effect of estrogrn birth control pills, or other environmental source. It can also result from the genetic condition Wilson's disease.

All heavy metals are particularly toxic, and some are essential such as Iron, Copper, Lead, Arsenic, Fluoride.

These element is a component of molecules that transport oxygen in blood. The physiological signs of Iron deficiency include anaemia, glossistis, Angutlar stomatitis, Koilonychia etc pathogenic consequence of Iron deficiency include immune function , Mental function impaired thermoregulath. Copper is involved in the cell metabolic activity and Copper regulates the expression of some genes Copper deficiency caused by a cellular defect in Copper transport and include a hypochromic, Normocytic, Macrocytic Anemia etc.

The present study showed that many metals and non-metals found in waste water. This water is affected. Vegetables irrigated by fresh water are good and fit for health as compared to contaminated water.

Conclusion

Metals are very important constituents for plants, animals and human beings but only in small amount but at high concentration they show toxic effect. Result indicates that this type of contaminated water is not good for vegetables and other crops and there for water should not be used for drinking purpose.

Uptake of metals and non-metals may increase the nutritional value significantly decrease crop yield. Where waste water was usually not fit for irrigation vegetables and severally damage human health. Quality of fresh water in home garden is relatively good for production of vegetables and other crops as compared to contaminated water.

References

1. T. M. Farid, K. C. Roy, K. M. Hossain and R. Sen.,*Environment,* **2003**,116-121.
2. Y. Sadovski, B. Fattal, D. Goldberg, E .Katzenelson, and H. I. Shuval., *Appl Environ microbial,***1978**, 36(6), 824-830.
3. S.Stasinos and Zabetakis., *Ecotoxicol Environ Saf*.,**2013**,91,122-8.
4. Khadeeja Rehman, Sobia Ashraf, Umer Rashid, Muhammad Ibrahim saadia Hina, Tehreema Iehreema, and Shahla Ramzan. *Pak. J. Bot*., **2013,** 45(2),391-400.
5. Samuel Jerry Cobbina, Mohammed Clement Kotochi, Joseph Kudadam Korese, Mark Osa A krong *Journal of Environmental Protection*., **2013**, 4, 676-682

6. Mousavi SR1,Balali-mood M,Riohi-Zanjanib,Yousefzadeh H, Sadeghi M.,*Int J occup Envion Med.,* **2013**; 4(2).
7. Jarup L., *Br. Med Bull*.,**2003**,68,167-82
8. Gupta N ,Khan DK, Santra SC.*Environ Monit Assess*.,**2012**;184 (11) .
9. Murray Unkovinch, Daryl Stevens,Guang-Guo Ying and Jim Kelly. *Australian Water Association.*, **2004**,1-64.
10. Gholamabbas Sayyad, Majid Afyuni, Sayed-Farhad Mohammad A.Hajabbasi, Brian K. Richards and Rainer Schulin., *Soil and Sediment Contamination: An International Journal,* **2009***,* 18 (2), 216-228.
11. S.M. Lmamul Huq, J.C. Joardar, S. Parvin, Ray Correll, and Ravi Naidu. *J Health popul Nutr.,* **2006**; 24(3) 305-310
12. Mousavi, H.Z. Asghari, A. Asian., *Journal of Chemistry,* **2009,** 21(4) 2881-2886 ,0970-7077
13. Seyed Reza Mousavi, Mahdi Balali-Mood, Bamdad Riah-Zanjani and Mahmood Sadeghi,*J Res Med Sci*. ,**2013**,18(1), 65-69.
14. Parissa karrari, Omid Mehrpour and Mohammad Abdollahi. DARU *Journal of Pharmaceutical Science*, **2014**,20.
15. G.M. Rabiul Islam, Faysal Elahi khan, M.D. Mozammd Hoque, Yeasmin Nhara Jolly. Environment Monitoring and Assessment., **2014**,186(11,)PP7233-7244.
16. K. Dixit, Pragna Desai, Dr. R. G .Varma, Dr. N. Pathak, Dr. S. Shukla, Rushina Natu, Ms. Saroj Agrawal., *Laboratory Manual Of Chemistry Practical*, **2011**,99-100.

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