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**Sharmistha Kumekar**  
Govt. Autonomous Holkar  
Science College, Indore,  
Madhya Pradesh, India

**Nameeta Bende**  
Govt. Autonomous Holkar  
Science College, Indore,  
Madhya Pradesh, India

**Kirti Yadav**  
Kasturba Gandhi College,  
Indore, Madhya Pradesh,  
India

**Megha Chourey**  
Govt. Autonomous Holkar  
Science College, Indore,  
Madhya Pradesh, India

**Correspondence:**  
**Nameeta Bende**  
Govt. Autonomous Holkar  
Science College, Indore,  
Madhya Pradesh, India

## Qualitative Analysis of Vegetables Irrigated by Fresh Water and by Contaminated Water Gangorghat, Bharwah (M.P.)

**Sharmistha Kumekar, Nameeta Bende, Kirti Yadav, Megha Chourey**

### 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 effect 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<sup>1</sup>. 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<sup>2</sup>. 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 nervous 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<sup>1</sup>. High levels of microbial contamination of vegetables irrigated with wastewater by the drip method was studied by Sadoovski et al<sup>2</sup>. Vegetables can absorb heavy metals from contaminated irrigation was studied by Stasinis et al<sup>3</sup>. Comparison of proximate and heavy metal content of vegetables grown with fresh and wastewater was studied by rehman et al<sup>4</sup>.

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<sup>5</sup>. 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<sup>6</sup>.

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

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

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

**Method and Material**

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<sup>16</sup>.

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

**Result and Discussion**

The studied area was Gangorghat, Bharwah(M.P.) and Vegetables taken were Radish, Spinach and Cauliflower.

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

Gangorghat, Bharwah (M.P.) - (Vegetables:-Radish, Spinach, Cauliflower)

**1- A. Non-metallic contaminations: Vegetable- Radish**

S. No.	Non-Metals	Contaminated Water	Fresh water	Vegetable (Radish) Irrigated By Contaminated water	Vegetables (Radish) irrigated by fresh water
1	Chloride (Cl <sup>-</sup> )	Absent	Absent	Present	Absent
2	Sulphate (SO <sub>4</sub> <sup>-2</sup> )	Absent	absent	Present	Absent
3	Nitrite (NO <sub>2</sub> <sup>-</sup> )	Present	Absent	absent	Absent
4	Nitrate (NO <sub>3</sub> <sup>-</sup> )	Present	Absent	Absent	Absent
5	Fluoride (F <sup>-</sup> )	Present	Absent	Present	Present
6	Phosphate (PO <sub>4</sub> <sup>-3</sup> )	Present	Absent	Present	Absent
7	Ammonium (NH <sub>4</sub> <sup>+</sup> )	Present	Absent	Absent	Absent

**1- B. Metallic contaminations**

S.No.	Metals	Contaminated Water	Fresh Water	Vegetable (Radish) Irrigated By Contaminated water	Vegetables (Radish) irrigated by fresh water
1	Lead (Pb <sup>+2</sup> )	Absent	Absent	Absent	Absent
2	Arsenic (As <sup>+++</sup> )	Present	Absent	Present	Absent
3	Copper (Cu <sup>+2</sup> )	Absent	Present	Absent	Absent
4	Iron (Fe <sup>+3</sup> )	Absent	Absent	Absent	Present

**2- A. Non-metallic contaminations (Vegetable:-Spinach)**

S.No.	Non-Metals	Contaminated Water	Fresh water	Vegetable (Spinach) Irrigated By Contaminated water	Vegetables (Spinach) irrigated by fresh water
1	Chloride (Cl <sup>-</sup> )	Absent	Absent	Absent	Absent
2	Sulphate (SO <sub>4</sub> <sup>-2</sup> )	Absent	absent	Absent	Absent
3	Nitrite (NO <sub>2</sub> <sup>-</sup> )	Present	Absent	Present	Absent
4	Nitrate (NO <sub>3</sub> <sup>-</sup> )	Present	Absent	Present	Absent
5	Fluoride (F <sup>-</sup> )	Present	Absent	Present	Absent
6	Phosphate (PO <sub>4</sub> <sup>-3</sup> )	Present	Absent	Absent	Absent
7	Ammonium (NH <sub>4</sub> <sup>+</sup> )	Present	Absent	Present	Absent

**2- B. Metallic contaminations (Vegetable:-Spinach)**

S. No.	Metals	Contaminated Water	Fresh Water	Vegetable (Spinach) Irrigated By Contaminated water	Vegetables (Spinach) irrigated by fresh water
1	Lead (Pb <sup>+2</sup> )	Absent	Absent	Absent	Absent
2	Arsenic (As <sup>+++</sup> )	Present	Absent	Present	Absent
3	Copper (Cu <sup>+2</sup> )	Absent	Present	Absent	Present
4	Iron (Fe <sup>+3</sup> )	Absent	Absent	Absent	Present

**3- A. Non-metallic contaminations (Vegetable:-Cauliflower)**

S. No.	Non-Metals	Contaminated Water	Fresh water	Vegetable (Cauliflower) Irrigated By Contaminated water	Vegetables (Cauliflower) irrigated by fresh water
1	Chloride (Cl <sup>-</sup> )	Absent	Absent	Present	Absent
2	Sulphate (SO <sub>4</sub> <sup>-2</sup> )	Absent	absent	Present	Absent
3	Nitrite (NO <sub>2</sub> <sup>-</sup> )	Present	Absent	Present	Absent
4	Nitrate (NO <sub>3</sub> <sup>-</sup> )	Present	Absent	Present	Absent
5	Fluoride (F <sup>-</sup> )	Present	Absent	Absent	Absent
6	Phosphate (PO <sub>4</sub> <sup>-3</sup> )	Present	Absent	Present	Absent
7	Ammonium (NH <sub>4</sub> <sup>+</sup> )	Present	Absent	Present	Absent

**3- B. Metallic contaminations: (Vegetable:-Cauliflower)**

S. No.	Metals	Contaminated Water	Fresh water	Vegetable (Cauliflower) Irrigated By Contaminated water	Vegetables (Cauliflower) irrigated by fresh water
1.	Lead (Pb <sup>+2</sup> )	Absent	Absent	Absent	Absent
2.	Arsenic (As <sup>+++</sup> )	Present	Absent	Present	Absent
3.	Copper (Cu <sup>+2</sup> )	Absent	Present	Absent	Absent
4.	Iron (Fe <sup>+3</sup> )	Absent	Absent	Absent	Present

The results found that all seven metals and non-metals were present in contamination water and when the waste water was used for irrigation it causes harmful effect both in soil and for environment. Intake of metals and non-metals from soil to edible part of vegetables were quite recognised and for almost all elements to investigate and these metal contaminated vegetables can causes different disease investigated of metals and non-metals and result obtained in table A and B.

Non-metallic contaminations and metallic contaminations present and absent in irrigated vegetables and in contaminated water.

Non-metallic contaminations (Contaminated water and vegetables) - i.e. The uptake of nitrite, Nitrate and Ammonium (non-metallic contamination) from irrigation water by spinach and cauliflower and fluoride present in waste water and vegetables (Radish and Spinach) but not present in cauliflower, phosphate also present in waste water and vegetables (Radish and Cauliflower) but not present in spinach.

Metallic contaminations (Fresh water and vegetables)- six non-metals are absent water and vegetables (Radish, Spinach, Cauliflower) fluoride is also absent in water, spinach and cauliflower but its present in radish.

Metallic contaminations (contaminated water and vegetables)-Arsenic(metallic contamination) is present in the vegetables(Radish, Spinach and Cauliflower) irrigated by contaminated water but Copper, Lead and Iron absent. These metals and non-metals absent in fresh water and vegetables irrigated by fresh water.

Metallic contaminations (Fresh water and vegetables)-Lead, and Arsenic are absent in water and vegetables (Radish, Spinach, Cauliflower). Copper is absent in Radish and Cauliflower but its present in water and Spinach. Iron is absent in vegetables but present in 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 therefore 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.

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