



STUDY OF HEAVY METAL ACCUMULATION IN IRRIGATED IN UDGIR, INDIA

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Abstract

The wastewater of Udgir city has been utilised by the farmers in the fort area for irrigating agricultural crops and vegetables. Heavy metals in sewage can negatively affect plant growth and health, animal health, human health and have other environmental impacts. Plants have different elements uptake rate and heavy metal tolerance, there subsequent entry into the food chain would cause health hazard to animals and human beings. Thus the accumulation of heavy metals in plant parts needsto be monitord when they are grown on the sewage water irrigation. Hence in the present work the effect of Wastewater on heavy metal accumulation in sewage irrigated vegetables such as Spinach, Tomato and Radish have been studied. The heavymetals like Fe, Cd, Cu, Zn, and Pb were analysed in sewage irrigated vegetables. The concentration of all the heavy metals are within the permissible limit of Indian standardexcept Cd and Pb.

Keyword: Heavy Metals; ; Sewage; , Wastewater, Irrigation

Introduction

Udgir is a taluka place having a population over over 1 lakh over. The municipal water supply is through a lake but in order to meet the inadequate supply for the fast expanding population, water is obtained through tubewells. The lake water is soft for drinking purpose but tubarale waters are hard as they contain huge amount of dissolved salts. The town is having a big commercial centre and there are small scale industries like oil Mills, pulse Mills etc. Water is mostly used for washing and cleaning. Therefore the sewage mostly comes under the category of domestic sewage. Besides washing and cleaning, Udgir sewage contains human and live stock excreta which include urine, faecal matter etc. Common vegetables like spinach, coriander, brinjal, radish, cabbage, tomato, onion and garlic are regularly grown by using sewage water. The municipality auctions every year sewage water and is a source of revenue. Production of vegetablesby using sewage water is cheap, effective, safe and in expensive method of irrigation.

Utilization of water resources is crucial to agricultural production for meeting the ever increasing demand of irrigation water for producing more and more food.

Since resources are limited and large gap exists between available water supply and amount required, appropriate use of wastewater for domestic origin can help in meeting can help in meeting a part of increased demand of water for crop production. Industrial and domestic effluents with solid and liquid sewage components are being used for irrigation reuse of wastewater for irrigation in agriculture is increasingly contemplated, since this wastewater cannot be used in other sectors and wastewater may have to be used for irrigation to make up the deficit in available of freshwater for agriculture in the interest of food security. Sewage farming is the old practice for the cultivation of vegetables in Udgir

Method and material

The present investigation was carried out by collection of sewage water samples where where leafy and fruit vegetables irrigated with sewage water. Water samples are collected in polythene cans by employing grab sampling method (APHA, 1985). The methods suggested for sewage water analysis as per APHA (1985) have been used. The soil samples where collected in the fields which were irrigated by sewage water. Collected samples where allowed to dry under shade and then stored in polythene bags for

analysis. Plant samples were collected at site irrigated with sewage water three plant samples i.e. spinach, radish and tomato were collected, washed with distilled water and

oven dried and the samples were powdered by using grinding and preserved for further analysis.

Results and Discussion

Table : Showing heavy metal conc. (mg·Kgs) in

The mean values and range of heavy metals in sewage pre and post harvested soil and vegetables are shown in Table

Heavy metals in vegetables	Fe (%) (mg·Kg ⁻¹)	Zn (mg·Kg ⁻¹)	Pb (mg·Kg ⁻¹)	Cd (mg·Kg ⁻¹)	Cu (mg·Kg ⁻¹)
Spinach	0.09-1.95 (1.38)	51.23-69.45 (63.91)	23.75-35.95 (31.42)	0.10-1.80 (1.09)	17.50-35.50 (24.72)
Tomato	0.60-0.90 (0.86)	47.50-67.15 (59.25)	18.10-29.50 (24.51)	0.10-0.90 (0.61)	15.20-28.10 (21.31)
Radish	0.80-1.8 (1.12)	50.10-68.12 (60.84)	22.0-32.25 (28.99)	0.17-1.40 (0.87)	17.40-37.35 (24.35)

Conclusion and Recommendation

Urbanisation has changed the lifestyle of human being. Formation of huge amount of domestic sewage provided an alternative to irrigate land using this waste water for vegetable production. Use of sewage for crop production had shown both beneficial and harmful effects on food value of vegetables. From the study it was concluded that iron Fe- content in foliage vegetables grown using sewage water was significantly high exceeding maximum level of recommendation. On the other hand tomato and radish recorded lower concentration and was well within the safe level. From the study it was understood that there is selective accumulation of different elements by different crop plants and plant parts. Plant analysis for heavy metal content for sewage irrigated spinach tomato and radish revealed that the cadmium contained and lead content was very high. The concentration for exceeded the guidelines for its maximum level in plants. It is recommended that as and when sewage is used for irrigation, then a thorough analysis of sewage soil under sewage cultivation and crop plant should be carried out to a certain the nutritional and contamination status of various components. There is always risk of entrance of heavy metals into the food chain affecting soil, plants, animals and human health.

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