

RESEARCH PAPER:

Accumulation nutrient and heavy metal content in wheat as influenced by irrigated with mix industrial effluents flowing in Khari river of Gujarat

J.K. PARMAR AND K.P. PATEL

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See end of the article for authors' affiliations

Correspondence to :

J.K. PARMAR

Department of
Agricultural Chemistry
and Soil Science,
Junagadh Agricultural
University,
JUNAGADH
(GUJARAT) INDIA

SUMMARY

A study was conducted to determine the chemical composition of wheat irrigated with effluents contaminated water flowing in Khari river of middle Gujarat region (India). Twenty - Twenty samples of wheat plant at harvest were collected from both contaminated and uncontaminated locations of the area of Nawagam-Vatava region of Gujarat (India) where effluent canal is passed. The plant samples of grain, straw and husk of wheat were used for analysis of total P, K, S, trace and heavy metals. The result indicated that P, K and S contents were higher in wheat grain, straw and husk samples of uncontaminated area except P content in wheat grain which was higher in uncontaminated area as compared to contaminated area. The micronutrients content were higher in wheat grain, straw and husk of contaminated area than in uncontaminated area. Further, it was noted that among the different micronutrients, Fe content in all the three components of wheat was very much higher than samples of uncontaminated area. Further, all the heavy metals were more concentrated in wheat grain, straw and husk parts in contaminated area. The Cr and Ni content in wheat grain, Cd, Co, Cr and Pb content in wheat straw and Co and Ni content in wheat husk were 123, 52, 57, 98, 141, 84, 61 and 142 per cent higher than wheat grain, straw and husk samples from uncontaminated area, respectively.

Key words :

Wheat, Heavy metals, Industrial effluents

In different parts of the country, the menace of a rapidly increasing population, the want on growth of industries and increasing urbanization has created major problems with the disposal of sewage and industrial effluents. These industries generate huge quantity of solid and liquid wastes. They contain appreciable amounts of metals besides beneficial nutrients. Therefore, their continuous application to soil may lead to accumulation of heavy metals which are likely to pose serious threat on soil health and plant growth as they depress the yield and quality. In Nawagam area, villages ponds are receiving effluent water through Khari canal/channel, which carries industrial effluents discharged from the industrial area of Naroda and Vatva. These effluents may or may not be biodegradable. It was also observed that there were approximately 1600 units of which, about 525 units generate effluents. Therefore, there are possibilities of the contamination of surface and ground water and soils of the area by chromium present in the wastewater released by the industry. Farmers in Nawagam area use effluent diluted with fresh canal water for irrigation purpose as and when required. In addition, water tube well of nearby effluent

canal is contaminated and being used by the farmers for irrigating their fields where rice-wheat sequence is mainly practiced. This has caused serious problems concerning food chain and consequently, the health of organisms, including human being. Therefore, the survey work was carried out to investigate the heavy metal toxicity in wheat crop growing in Nawagam-Vatava area.

MATERIALS AND METHODS

The twenty-twenty plant samples of wheat were collected in the end of *Rabi* season from uncontaminated areas of villages like Shrijipura (2), Chitrasar (2), Dharoda (2), Kathwada (1), Chalindra (1), Bareja (2), Bherai (1), Bakodara jara (1), Vadala (4), Dhathal (1) and Nayaka (3) as well contaminated areas of villages like Chalinra (1), Pinglaj (2), Nawagam (3), Pansholi (2), Malarpur (1), Kanera (1), Girmatha (1), Lambha (1), Sarasa (1), Lali (2), Umiyapura (2), Bidaj (1) and Nayaka (2). The samples were washed with 0.3 N HCl, single and double distilled water in a sequence and air-dried. The samples were dried in paper bags at 70° C temperatures till

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