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Is it safe to grow vegetables in treated sewage water? A study in subtropical India

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Industrial and waste water for irrigation is on the rise in developing countries because of scarcity of fresh water. But the risk of heavy metals entering the food chain and causing health concern always remains. Treated sewage water (TSW), ground water (GW), soil and plant samples were collected and analysed to assess the long term effect of irrigation with TSW on Cd, Cr, Ni and Pb build up in soils and its subsequent transfer into commonly grown vegetable crops (radish, turnip, carrot, bean, cauliflower, brinjal, potato, cabbage, spinach and coriander). TSW contained Cd, Cr and Ni in amounts well above the permissible limits for its use as irrigation water. Long term application of TSW resulted in significant build up of total and DTPA extractable Cd, Cr, Ni and Pb over GW irrigated sites. The tissue metal concentration and relative efficiency of transfer of heavy metals form soil to plant for various groups of vegetables were worked out. Radish, turnip and spinach were grouped as metal accumulators whereas brinjal and cauliflower accumulated less heavy metals. Health risk assessment by consumption of vegetables grown in TSW indicated that all the vegetables grown in the region with TSW were safe for human consumption. However appropriate choice of vegetables can further lower the risk of metal contamination in food.