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Contaminated vegetables from polluted gardens may pose health risk

City dwellers who grow their own fruit and vegetables may be consuming high levels of pollutants. In a recent study, researchers found that vegetables grown on plots in Berlin, Germany, often contained higher concentrations of some heavy metals than shop-bought vegetables, with those grown close to busy roads containing the greatest quantities.

Interest in 'grow your own' vegetables is increasing around the world, and can bring benefits for food security, community wellbeing and the environment. Growing vegetables in home gardens or on allotments is considered to be healthier than buying them from supermarkets, due to lower levels of pesticides. However, growers may not be aware of the potential risks associated with growing vegetables on contaminated soils in urban environments. Previous studies have already suggested that eating vegetables grown on polluted soils could lead to serious health issues.

The study focused on vegetables grown in central Berlin. They measured concentrations of the metals cadmium, chromium, lead, zinc, nickel and copper in fruits (tomatoes and green beans), root and stem vegetables (carrots, potatoes and kohlrabi) and leafy vegetables and herbs (white cabbage, watercress, chard, basil, mint and thyme). They were also interested in whether nearby traffic was affecting contamination levels, so they divided growing sites into those with high, medium and low traffic burden, taking into account distance to nearest road, the number of vehicles using the road, and any buildings acting as barriers between the growing site and the road.

Levels of metal contaminants differed widely depending on the metal and the specific crop species. For example, tomatoes contained lower levels of lead than chard, and mint contained higher levels of chromium than basil, green beans and carrots. Overall, however, levels were significantly higher than those in supermarket vegetables. Some of the worst examples were tomatoes containing 11 times as much cadmium and nearly five times as much nickel as supermarket tomatoes, and chard containing six times more zinc than shop-bought chard. Several other crop species contained at least twice the level of at least one metal compared to supermarket products.

All vegetables contained higher concentrations of lead if they were grown on sites with high levels of traffic. Concentrations of other metals were associated with traffic burden in specific crops. For lead, EU standards were exceeded by two thirds of the crops sampled from sites with high traffic burdens, less than 10 metres from busy roads, but this statistic was reduced to around a third on sites where buildings acted as barriers between the vegetable plot and the road.

According to the researchers, their study suggests that crops grown in city vegetable plots are not automatically 'healthy' or 'safe' compared to supermarket products. To reduce contamination levels and health risks, growers should be advised to choose planting sites carefully, based on distance and barriers to traffic. They also suggest that the pollution risks must be weighed against the societal benefits of urban horticulture.

Source: Saeumel, I. Kotsyuk, I, Hoelscher, M. *et al.* (2012). How healthy is urban horticulture in high traffic areas? Trace metal concentrations in vegetable crops from plantings within inner city neighbourhoods in Berlin, Germany. *Environmental Pollution*. 165, 124-132. DOI: 10.1016/j.envpol.2012.02.019.

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