



A Scoping Review of Heavy Metal Contamination in Urban Market Vegetables and Biomarker Evidence of Consumer Exposure in Kinshasa, Democratic Republic of the Congo: An African Perspective, 2014

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Abstract

Urban agriculture is a crucial food source in African cities but may pose health risks. In Kinshasa, Democratic Republic of the Congo, vegetables from urban markets are a suspected pathway for heavy metal exposure. The link between contamination levels in these vegetables and evidence from human biomarkers is not well synthesised. This scoping review aimed to map and synthesise evidence on the association between heavy metal contamination in vegetables sold in Kinshasa's urban markets and biomarker evidence of exposure among the city's consumers, providing an African perspective. A scoping review was conducted following established frameworks. A systematic search was performed across multiple electronic databases and grey literature sources. Studies were included if they reported heavy metal levels in market vegetables from Kinshasa and/or biomarker data from Kinshasa consumers. Data were charted and analysed thematically. The review identified a notable scarcity of studies directly linking vegetable contamination with human biomarkers. Available evidence consistently showed that vegetables, particularly leafy greens, from Kinshasa markets contained elevated levels of lead and cadmium, often exceeding international safety limits. However, only a limited number of studies concurrently measured consumer biomarkers. These suggested a potential exposure pathway but could not establish definitive causation. There is clear evidence of heavy metal contamination in Kinshasa's market vegetables, indicating a plausible public health risk. A critical evidence gap exists in directly correlating this environmental contamination with internal dose measures in the exposed population. Future research must adopt an integrated approach, concurrently measuring vegetable contamination and consumer biomarkers. Public health authorities should consider implementing monitoring programmes for market vegetables and investigating mitigation strategies for urban agriculture. Community awareness campaigns on vegetable washing and sourcing practices are also warranted. heavy metals, food contamination, urban agriculture, biomarkers, public health, Democratic Republic of the Congo, scoping review This review consolidates the evidence on a potential

environmental health pathway in an African megacity and clearly identifies the critical gap between environmental contamination data and biomonitoring evidence, providing a direction for future research and public health action.

Keywords: *Heavy metals, Urban agriculture, Biomarkers, Food contamination, Sub-Saharan Africa, Scoping review, Environmental exposure*

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