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"Solidarity in a competing world — fair use of resources"

Microbiological Analysis of Contamination Risks in Urban and Peri-Urban Vegetable Production of Ouagadougou, Burkina Faso

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Abstract

The production of vegetables in and around urban open space areas of Ouagadougou (Burkina Faso) supplies city residents with fresh vegetables all year round, and contributes to food security. As in most of West Africa, the economic opportunities offered especially by exotic vegetable production in and around cities are significant, moving famers above the poverty line. The absence of environmental safeguard policies and food safety standards may pose health risks for producers and consumers, as irrigation water for vegetable production is often taken from raw or diluted sewage.

The purpose of this study was to analyse to which degree irrigation water and lettuce plants of ten production areas with either sewage polluted channels (n=4) or wells (n=6) as water source for irrigation was contaminated by total and fecal coliforms. A particular focus was placed on *Escherichia coli* and tracking of bacteria loads on lettuce leaves along the food supply chain (from field to fork).

The results show that lettuce irrigated with channel water had a similar load of faecal bacteria as lettuce irrigated with well water. Well water was also polluted by coliforms and channel water was cleaner than expected. At three locations (n=10) irrigation water met the health based target for lettuce of less than 10^3 *Escherichia coli* per 100 ml irrigation water. Irrespective of the source, contamination of irrigation water varied between 3.6×10^3 and 1.87×10^7 total coliform per 100 ml. This wide range is also reflected in the crop contamination at the farm gate, where lettuce had on average a load of 5.03×10^5 total coliforms per g (n=10). Postharvest data showed that regardless of the lettuce treatment along the marketing chain *Escherichia coli* and total coliform rates increased on average by one log unit until the final sales point. Additional experiment showed that appropriate postharvest handling could prevent such increase in total coliforms. We concluded that inappropriate lettuce handling after harvest constitutes a major source of risk for produce contamination in Ouagadougou.

Keywords: *Escherichia coli*, lettuce, peri-urban, total coliform, urban

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