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“Development on the margin”

Safety of Horticultural and Livestock Products Originating from Urban and Peri-urban Enterprises in two West African Cities

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Abstract

In many African countries, urban and peri-urban agriculture is very important for income generation of farmers and customer supply with fresh vegetables and fruits, meat, eggs and milk. However, it raises numerous public and environmental health concerns, due to intense use of fertilisers and pesticides in vegetable production and unhygienic conditions especially in the dairy sector. Therefore the present study assessed the contamination of irrigated lettuce and cow milk with fecal pathogens, and of tomato and cabbage with pesticide residues in the cities Bobo-Dioulasso (Burkina Faso) and Sikasso (Mali). During, cold dry, hot dry and rainy seasons, samples were taken from irrigation water, organic fertilisers and lettuce in seven gardens across the two cities, and of curdled and raw milk in six dairy farms in Sikasso. Pesticide residues were analysed in samples of cabbage and tomato from eleven and three gardens, respectively. Data on registered incidences of diarrhea/vomiting and typhoid fever were gathered from eleven health centres at Sikasso. Wastewater and organic fertiliser were major sources of lettuce contamination with thermo-tolerant coliforms and *Escherichia coli* — their concentration in irrigation water by far exceeded WHO recommendations for unrestricted irrigation of vegetables consumed raw. Contamination levels of lettuce at farm gate and market place were higher in Bobo-Dioulasso than in Sikasso ($p < 0.05$), and dry season contamination levels were higher than rainy season levels in both cities. Concentrations of thermo-tolerant coliforms and *Escherichia coli* were higher in curdled than in raw milk ($p < 0.05$) at all sampling dates. Residues of the pesticide Cypermethrin were detected in only one cabbage and one tomato sample; in both cases the concentration was below the maximum threshold limit for consumption. From 2005 to 2009, the registered cases of diarrhea/vomiting and typhoid fever had increased by 65% and 400%, respectively, in Sikasso; they might be linked to consumption of contaminated vegetables and milk. A holistic approach that improves hygienic standards along the production, processing and marketing chain is needed to reduce consumer health risks ensuing from current production and post harvest processing practices of highly perishable commodities in West African cities.

Keywords: Bobo-Dioulasso, *Escherichia coli*, milk, pesticide residues, Sikasso, thermo-tolerant coliforms, vegetables