

ABSTRACT

Pesticide use has been on the rise especially in vegetable production like potatoes in order to increase yields and be able to meet the food demand. Food safety bodies have set maximum residue levels (MRLs) to ensure that food items are produced following good agricultural practices (GAPs). In Kenya there's almost no crop-specific MRLs surveillance information or information on pesticide residue levels for raw or processed potato products despite the fact that potato is a key food security crop and its processed products are a favorite snack to the majority of the Kenyan population. Therefore this study seeks to determine exposure levels of consumers of potato and potato products to pesticide toxicity and if processing enhances the levels or not. The study proposes to assess the current diversity of pesticides and their applications in potato production and storage, to approximate the exposure of potato consumers to pesticide residues in raw and processed potato products, to determine accumulation of pesticides in different potato varieties and to determine how processing affects stability of pesticide residues in potato products commercially traded in Kenya. A survey will be done in Nyandarua and Bomet Counties to establish pesticides used in potato production and storage. Exposure levels will be determined through food consumption patterns survey that will be carried out in Nairobi and analysis done using Monte Carlo probabilistic tests/simulation models and dietary risk assessment. Further, field production of potato varieties preferred for processing will be done using good agricultural practices (GAPs). After harvesting the raw tubers will be taken to University of Nairobi laboratory to determine pesticide residue accumulation in varieties. Some of the raw tubers will be processed and analysed to determine if processing affects the pesticide residue levels. Pesticide extraction will be by multi-residue procedure using gas chromatography with mass spectrometry (GC/MS) and QuEChERS and liquid chromatography -tandem mass spectrometry (LCMS/MS). Data analysis for surveys done will be done using social science statistical package, SPSS version 21 with non-parametric tests done with 95% confidence level. Results on recoveries will be presented in table forms showing percentage recoveries and LOQs. Linear equations and regressions will be used to present results on linearity and calibration results. The statistical significance tests will be done at 95% confidence level. Data obtained will be inform policy makers to set limits on crop specific MRLs, thresholds of pesticide residue levels of potato and potato products.

Key words: Acute daily intake; Food safety; Pesticide residues; Potato; Simulation models