Exposure of the general populace to pesticides could be high in Ghana where staple foods such as maize and cowpea are routinely sprayed with pesticides to protect them against insect pests. Significant contamination of maize and cowpea has been reported in some neighbouring countries (Ogah et al. 2011; Khan et al. 2012). However, there is no quantitative information on the levels of pesticide residues and associated health risks based on the exposure of the population through maize and cowpea consumption. This poster presents information on contamination levels of pesticides in maize and cowpea from Ejura, the largest maize production district in Ghana. It assesses the human health risk through estimated average daily intakes (EADIs) as compared with acceptable daily intakes (ADIs) set by FAO/WHO (2010).

Material and methods

Samples were collected from 10 maize and 10 cowpea farms during harvest from Ejura in the Ashanti Region of Ghana in December 2012. A total of 37 pesticides comprising 15 organochlorine, 13 organophosphorus and 9 pyrethroid pesticides were investigated in maize and cowpea samples obtained from farms in Ejura for their contamination levels. Analytical methods included solvent extraction of the pesticide residues and their subsequent quantification using Gas Chromatograph equipped with Electron Capture Detector and Pulse Flame Photometric Detector after clean-up on alumina/activated charcoal column.

Results and Discussions

Mean concentration of pesticides in maize ranged from 0.001-0.103 mg/kg for organochlorine pesticides, 0.002-0.019 mg/kg for organophosphorus pesticides and 0.002-0.028 mg/kg for pyrethroids pesticides. In cowpea the mean concentration ranged from 0.001-0.108 mg/kg for organochlorine pesticides, 0.002-0.015 mg/kg for organophosphorus pesticides and 0.001-0.039 mg/kg for pyrethroids pesticides. Maximum Residue Limits for β-HCH, β-endosulfan, p,p’-DDE and p,p’-DDD were exceeded in both maize and cowpea samples. Health risk estimation revealed that residues of heptachlor, dieldrin, endrin, β- endosulfan, γ-chlordane and chlorfenvinphos found in maize exceeded the acceptable daily intake. Similarly the levels of heptachlor and p,p’-DDD found in cowpea also exceeded the acceptable daily intake. This suggests a great potential for chronic toxicity to consumers of these food items.

Conclusion

There is pesticides contamination in both maize and cowpea samples. The residual levels of β-HCH, β-endosulfan, p,p’-DDE, p,p’-DDD, fenpropatrin and λ-cyhalothrin in maize and β-HCH, β-endosulfan, p,p’-DDE and p,p’-DDD in cowpea exceeded their respective maximum residue limits. Maize was highly contaminated with organochlorine, organophosphorus and pyrethroid pesticides. Heptachlor, aldrin, dieldrin, endrin, γ-chlordane and chlorfenvinphos in maize as well as heptachlor and p,p’-DDD in cowpea present the highest risk to consumers’ health.

Reference