Occurrence and Distribution of Organophosphate Pesticides Residues in Vegetable and Soil from Akufo Farm Settlements in Ido Local Government Area of Oyo State, Nigeria

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Introduction

- Organophosphorus (OPs) compounds are from large groups of chemicals that is used over the past 60 years as pesticides for protecting crops, livestocks, and as warfare agents.
- However, the greater use of pesticides for high agricultural production and pest control has led to increased pollution of environmental media such as soil, water and air, while also altering the food chain and the ecosystem balance
- A pesticide is principally a chemical substance that is envisioned to kill, prevent, or control the growth of pests which includes insects, rodents, unwanted plant growth, or certain kinds of animals that can damage the crops. By their very nature, most pesticides show a high degree of toxicity because they are intended to kill certain organisms and thus create some risk of harm (Abdelgadirand and Adam, 2011).
- Wrong application techniques, badly maintained or totally unsuitable spraying equipment and inadequate storage practices exacerbate these risks. (Al- Wabel *et al.*, 2011).

Objective of the Study

- This study is aimed at determining the occurrence and distribution of organophosphate pesticide residues in vegetable samples commonly cultivated and consumed; and in soil samples from Akufo farm settlement in Ido Local government.

Scope of the Study

The study covers the screening and analysis of eighteen organophosphates pesticides residues which are commonly used to control pest in vegetable and soil samples in two farm lands in Akufo area of Ido local government

Justification

- The extensive application of pesticides in cultivated soils may leads to the contamination of cultivated crops, soil and other environmental media by pesticides (Muñoz- Leoz *et al.*, 2013).
- Therefore, there is need to investigate the potential risks associated with the use of organophosphates pesticides by farmers in Akufo farm settlements who use these pesticides to control cultivated vegetable pest.

Methodology

- Vegetable and soil samples were collected from a farmland in Akufo settlement at two points. Both samples were prepared according to standard methods and analysed using GCMS to target 18 organophosphate pesticide residues in both samples.

Results

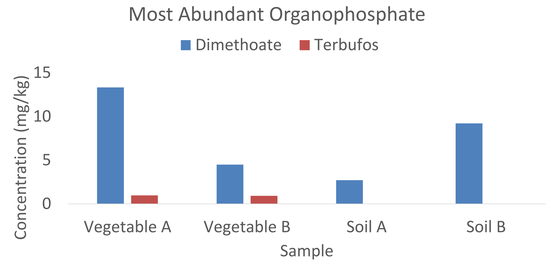
12 out of the 18 targeted organophosphate pesticides residue were detected in the vegetable sample A while 15 were detected in vegetable samples B.

10 out of the 18 targeted organophosphate pesticide residues were detected in soil sample A while only 8 were detected in soil sample B.

Dimethoate is the most abundant organophosphate compound detected in the vegetable (13.32 and 4.49 mg/kg respectively) and soil samples (2.71 and 9.21 mg/kg respectively). Terbufos (0.97 and 0.92 mg/kg) was the next most abundant in the vegetable samples.

The concentration of dimethoate observed in the vegetable samples far exceeded the maximum residue limits range (MRL) (0.05-5 mg/kg) permitted in all the different food items as set by the FAO/WHO codex alimentarius international food standard of pesticide residues.

Terbufos levels in the vegetable samples also exceeded the 0.01-0.3 mg/kg maximum residue limit range widely quoted for most crops and animal products in the FAO standards.



Conclusions

- This study suggests that the farmers in Akufo farmland appears to be applying a broad spectrum of organophosphate pesticides with a significant presence of dimethoate residue in both vegetable and soil samples.
- The pesticide residues were more prevalent in the vegetable samples than in the soil samples where dimethoate is the most prevalent in both vegetable and soil samples exceeding the maximum residue limit in both vegetable samples, thus posing risk to consumers of such vegetables.
- Terbufos and dichlorvos levels also exceeded the MRL recommended for some crops and thus may need to be monitored in various edible crops. Thus, the findings show potential risks and concern for public health and environment as some of the vegetables sold in the markets are supplied from this farm settlement.

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