Research Journal of Agriculture and Forestry Sciences
Vol. **1(1),** 27-28, February **(2013)** *Res. J. Agriculture & Forestry Sci.*

Short Communication

Determination of Chlorinated Pesticide in Vegetables, Cereals and Pulses by Gas Chromatography in East National Capital Region, Delhi, India

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Available online at: www.isca.in
Received 17th January 2013, revised 5th February 2013, accepted 7th February 2013

Abstract

The present study investigates the magnitude of contamination of DDT pesticides in vegetables, pulses and cereals which were brought for sales to the consumer in the local markets of Sahibabad and Ghaziabad, most of the collected samples were found to be contaminated with residues of DDT. In some of detected samples DDT exceeded the limit of tolerance prescribed by WHO and FAO.

Keywords: Contamination, pesticides, DDT, WHO

Introduction

Food is an essential for human growth. Growing demand for food as a result of increasing population has lead to a substantial increase in the application of agro chemicals like fungicides, insecticides, herbicides, and fertilizers resulting in continued contamination of our environment and food[1] .Public concern over pesticide residue has risen over the past decade to the point where it has become a significant food safety issue[2].

About 120 pesticides are registered for use in India in which DDT is the most common. Among the chlorinated pesticides DDT was first which came to the rescue of public health. The production of technical DDT in Indian over 4000 ton and the consumption was 9000 ton[3] .Very little work on this vital issue of monitoring of DDT residues in different commodities done in India.

DDT was the first to be banned because it readily accumulated in the animal tissues. A clinico pathological study[4] was conducted in workers engaged in pesticides like DDT and its isomers, observed that these workers were suffering from skin disease. In many developing countries DDT were widely used to increase food production and control plant disease and pest in cereals, pulses, vegetables for growing population[5].

The determination of pesticides residues in food has become an increasing essential requirement for consumer, producers and authorities responsible for food quality control[6]. The aim of present study is measuring the level of DDT in various food articles like vegetables, pulses and cereals by collecting the samples from East National Capital region(NCR). The present report depicts a clear picture recording the DDT residues level in cereals, pulses and vegetables from different locations of Ghaziabad and Sahibabad.

Material and Methods

All chemicals were of analytical grade for the estimation of DDT. Reagents like sodium chloride, anhydrous sodium sulphate and solvents are n-Hexane, acetone, petroleum ether. Sample of cereals, pulses and vegetables were collected from different region of East NCR in Ghaziabad and Sahibabad.

Extraction of cereals and pulses sample of 50 g was extracted with 100 mL and 50 mL portion of methyl cyanides and water in the ratio of 2:1. Now filtered it after 5min by using Whatmann No.1 filter paper. Filtrate is diluted with 100 mL of n-hexane.

Vegetable samples were extracted twice with 100 mL methyl cyanide, clean up method of cereals, pulses and vegetable was done by chromatographic column. The extract was taken in funnel and added it H_2SO_4. The upper layer washed with 50 mL of distilled water and then extract was passed through chromatographic column containing charcoal and anhydrous Sodium sulphate.

DDT residues were estimated on Hemlett Packard Gas chromatogram 5840A. Standard chromatogram for estimation of DDT was obtained as per computer programming described. The computer program was tapped on magnetic taps during the course of analysis. Every after 10 unknown samples, the standards were injected and chromatogram was reproduced for comparison. Aggregate total of mp, op and pp DDT is represented as total DDT residues.

Results and Discussion

In the area of Sahibabad out of 21 samples of Wheat only 12.16% samples contained DDT residues, in the range of .012 to .120 ppm shown in table1.

Table-1
DDT residues in Cereals, Pulses and Vegetables in East National Capital Region, Delhi

Sampling location	Food samples	No. of samples analysis	No. of samples containing DDT residues					Residue Level(ppm)	
			BDL	1ppm	1 to 5ppm	5 to 6ppm	7ppm	Min.	Max.
	Cereals								
Sahibabad	Wheat	21	18(76.36)	3(12.16)	-	-	-	.012	.120
	Rice	22	19(74.61)	4(14.56)	-	-	-	.014	.160
	Oat	20	18(83.23)	3(12.21)	-	-	-	.021	.023
	Maize	21	16(80.21)	2(21.20)	-	-	-	.012	.014
	Pulses								
Rajnagar	Masoor	10	6(65.00)	4(22.22)	2(12.00)	-	-	.032	.220
	Urad	10	5(54.00)	3(30.00)	2(15.20)	-	-	-	
	Arhar	15	8(54.44)	2(20.00)	2(14.22)	2(13.12)	-	-	.321
	Moong	15	5(40.00)	2(22.21)	2(20.00)	2(15.00)	-	.022	.122
	Chana	10	7(70.00)	2(20.00)	-	1(12.00)	-	.167	2.156
	Vegetables								
Ghantaghar	Potato	5	5(90.00)	3(50.00)	-	-	-	.063	.223
	Tomato	5	2(40.20)	-	-	-	-	-	-
	Onion	5	2(65.66)	2(20.00)	-	-	-	.040	.657
	Lady's finger	5	3(78.00)	1(18.00)	1(15.00)	1(20.12)	-	.341	3.234
	Bean	5	3(70.00)	1(16.20)	-	-	-	-	-
	Pumpkin	5	2(54.00)	1(20.22)	1(22.00)	-	-	.420	3.562
	Gourd	5	2(45.00)	2(22.00)	1(20.00)	-	-	.220	.078

The analysis of 22, 20 and 21 samples of Rice, Oat and Maize indicated that 14.56% Rice, 12.21% Oat and 21.20% Maize samples contained DDT residues, in the range of .014 to .160ppm Rice, .021 to .023 ppm Oat and .012 to .014 ppm Maize.

The analysis of 10,10,15,15and10 samples of Masoor, Urad, Arhar ,Moong and Chana respectively collected from Rajnagar were analyzed, out of which 34.22% Masoor, 45.20% Urad, 47.34% Arhar, 57.21% Moong and 32.00% Chana contained DDT residues in the range of .022 to 2.156 ppm.

Samples of vegetable collected from Ghantaghar. Analysis of 5 samples of each Potato, Tomato, Onion ,Lady's finger, Bean, Pumpkin and Gourd were analyzed for DDT residues and found that 50,0,20,53.12,16.20,42.22 and 42% of samples contained DDT residues, only Lady's finger and Pumpkin contained residues 3.234 ppm and 3.562 ppm respectively above the limit of tolerance.

Conclusion

The conclusion of various studies conducted suggests to minimize the social evil of pesticides in food grains. Pesticides which are used in large quantity in food articles are the most toxic for human beings. An attempt has been made to discuss regarding implementation of the rule framed under the prevention of food adulteration act as a practical approach of consumers and traders. Area where the existing provisions have failed to tackle the problem of adulteration in food articles and steps to be taken to modify the existing provision of the act and rules have been identified.

Acknowledgement

The author is greatly indebted to the competent authority of Central Food Laboratory Ghaziabad and Bureau of Indian Standard Sahibabad, Ghaziabad for providing laboratory facility and guidance.

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