

NOTE

**Determination of Chlorinated Pesticides in
Wheat by GC Method**

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This study reports, the magnitude of contamination of chlorinated pesticides in wheat which were brought for sales to the consumer in the local markets of east national capital region. Most of the collected samples were found to be contaminated with residues of chlorinated pesticides. Many of the detected samples were found to be exceeded the limit of tolerance prescribed by WHO/FACO.

Key Words: Pesticides, Wheat, Gas chromatography.

Food is an essential for human growth. Growing demand for food as a result of increasing population has lead to substantial increase in the application of agrochemicals such as pesticides and fertilizers, resulting in continued contamination of our environment and food. Public concern over pesticide residues has risen over the past decade to the point where it has become a significant food safety issue^{1,2}.

The determination of pesticide residues in food has become an increasing essential requirement for consumer, producer and authorities responsible for food quality control³.

Organochlorine pesticides (OCPs) were the most popular pesticides used in the world since last few decades. OCPs such as DDT, BHC, aldrine were used in excess and found to be chlorinated persistent organic pollutants. OCPs have been linked to carcinogenicity and endocrine disruption in mammals. Therefore, concern over toxicity are exacerbated by their hydrophobic properties, which results in the bioaccumulation of OCPs in fatty tissues and biomagnifications through the trophic web. These chemicals are now being banned from manufactures and restricted in use in most countries. Living organisms including human beings can still come in contact with them by breathing contaminated air, eating contaminated food and drinking or washing in contaminated water⁴⁻⁶.

The present studies are aimed at measuring the level of chlorinated pesticides in wheat and the present report gives a clear picture recording

the chlorinated pesticide residues level in wheat from different location of east national capital region.

The samples of wheat were collected from the dealers at different markets in different form from the different areas in the east part of national capital region, stored in the refrigerator and analyzed by approved gas chromatography method of analysis for pesticide residues.

Sample preparation and extraction of wheat: 50 g sample with 250 mL of 2:1 mixture of acetone and water was blended for 2 min and filtered with buchner fitted with shark skin Whatmann filter paper no. 1. Sample extract was placed in 1 L separator and treated with 1:1 mixture of methylene chloride and petroleum ether. The organic layer was separated, dried over sodium sulphate and concentrated in a rotary vacuum evaporator. The concentrate was diluted with acetone and re-concentrated. The process was repeated twice. The aqueous layer was treated with sodium chloride and sample was extracted with methylene chloride, dried over sodium sulphate and concentrated. All the concentrates were mixed and subjected to Florisil clean up method using 1:16 mixture of diethyl ether and pet. ether as eluate. The sample was concentrated and analyzed by gas chromatography method in which 1-2 μ L aliquot of prepared sample was injected along with the external standard of the analyte of interest. The chromatograms of sample and standard were compared on the basis of peaks and retention time. Quantity was determined by comparing areas of sample with that of the external standard.

Table-1 shows that various wheat samples are contaminated with different pesticides. It is seen from the Table-1 that the concentration of organochlorine pesticides varied from 0.009- 0.069 mg/kg of sample. The peaks corresponding to β -BHC at area 610584 and retention time of β -BHC is 9.96 min, DDE shows the corresponding peak at area 132556 and retention time is 15.01 min. The peak areas and retention time of the samples and standard were compared.

TABLE-1
PARAMETER OF WHEAT

Organochlorine pesticides	No. of Samples	Result (Pesticides/ Samples) (mg/kg)	Detect limit
DDT	10	0.0210	0.01
DDD	3	0.0120	0.01
DDE	1	0.0090	0.01
BHC	2	0.0093	0.01
β -BHC	2	0.0690	0.01
Lindane	2	0.0250	0.01

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REFERENCES

1. H.C. Agarwal, *Bull. World Health Organ.*, **54**, 349 (1976).
2. A. Colume, S. Cardenas, M. Gallego and M. Vacarcel, *J. Chromatogr. A*, **849**, 235, 243 (1999).
3. A. Aguilar, M. Brotons, M. Roelriguez and A. Valverele, *J. Agric. Food Chem.*, **51**, 5616 (2003).
4. F. Wania and D. Mackay, *Environ. Sci. Technol.*, **30**, 390 (1996).
5. A.M. Patlak, *Environ. Sci. Technol.*, **30**, 540 (1996).
6. R.P. Singh, *Bull. Environ. Contain. Toxicol.*, **67**, 127 (2001).

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