

ESTIMATION OF PESTICIDES IN SOIL SAMPLES IN GHAZIABAD (UP) INDIA

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ABSTRACT

Soil samples of surface (0-20cm) and sub- surface Soil (20-40cm) were analysed for presence of pesticide traces. Samples were collected from 15 selected points in agricultural fields and sediments near Hindon river bank in Raj Nagar.area of Ghaziabad. The sample size was stretched across 15sqkm. Pesticides were analyzed by GLC and identified by Comparing with standard reference compounds. HCH,Aldrain Endosulphan sulphate Heptachlor were found to be present in objectionable amounts in soil samples . β -HCH was more predominant than α -HCH and γ -HCH. DDT/DDE were not detected in any sample.

Keywords- Estimation, Pesticides, Soil, Monitoring, Ghaziabad

I. Introduction

Organic pesticides are extensively being used for agricultural pests and vector borne diseases. In spite of restrictions at governmental levels, synthetic pesticides continue to be used rampantly by agriculturalists, owing to their high and fast affectivity, low cost and versality in use [1]. Among these pesticides, chlororganic compounds, aldrin, heptachlor, endosulphan DDT, are of deep concern, due to their tendency to accumulate [2-4] in living tissues causing serious diseases to human beings. These have detrimental effect on soil flora and fauna [4-6]. Almost 95% of the pesticides being used today are synthetic in nature and most of them are non-biodegradable. Thus their continuous use leads to their accumulation in soil as well as in water [7-8] posing a threat to environment. If left unattended, pesticide pollution, will become a great environmental hazard and can prove fatal not only to mankind but to every form of life. Continuous and wide range monitoring of pesticide accumulation in environment is a serious need of the hour, to ensure necessary corrective measures, before it is too late. The present study reports the analysis of soil sample in Ghaziabad region for some commonly used pesticides.

II. Material & Methods

2.1 Sample Collection Samples of soil were collected from 15 different locations near agricultural fields and river bank sediments in Ghaziabad. A total area of 1.5 sq. km. was covered. About 15 kg. of soil sample was drawn from each spot. The sample were drawn at 0.20cm surface and 20-40cm subsurface depths. The samples were air dried in shade, screened and stored at sub zero temperature till analysis.

2.2 Extraction of Soil samples:- A representative (100 g) soil sample was mixed with 0.5 g activated charcoal in a beaker, followed by addition of 0.5 g florisil and 10 g anhydrous Na₂ SO₄. Then it was placed in a soxhlet apparatus along with acetone (10% in hexane) for about 8 hrs. The extract obtained was concentrated on a rotary evaporator to about 5 ml and then analyzed. The sample were analyzed by gas chromatography using a Nucon -Amil 5700 series gas chromatograph on a capillary column using Nitrogen as carrier gas with flow rate 1 ml/min. The column temperature was varied between 150-220⁰C. The pesticides were identified by comparing them with standard reference compounds obtained from commercial sources.

III. Result & Discussion

All the soil samples contained traces of pesticides like HCH, aldrin endosulphan sulphate and heptachlor in varied concentrations. The concentration of estimated pesticides and their retention time (R_t) is given in TABLE-1 and TABLE-2. The average concentration of HCH varied from 0.340 -0.290 µg/g in soil samples. HCH was most predominant isomer observed. Aldrin was also found in all samples in average concentration of 0.228 µg/g Endosulphan sulphate Heptachlor was found in lesser concentrations than other pesticides. The concentration of β, HCH was found be more than other isomers . this may be due to the fact that β isomer is more stable towards microbial degradation [9-10]. DDT/DDE were not detected probably due to strict banning of this pesticides and greater awareness among farmers

Table -1 Concentration of Various Pesticides in surface and subsurface soil

S.No	Compound	Conc. in surface soil µg/g	Conc. In subsurface soil µg/g
1.	α -HCH	0.320	0.340
2.	β -HCH	0.330	0.360
3.	γ-HCH	0.282	0.290
4.	Aldrin	0.215	0.228
5.	Heptachlor	0.094	0.118
6.	Endosulphan sulphate	0.062	0.078
7.	DDT,DDE	ND	ND

Table -2 Retention (R_t) Time of various Pesticides under given conditions

S.No	Compound	Retention time(R _t)
1.	α -HCH	14.8
2.	B-HCH	18.5
3.	γ-HCH	18.9
4.	Aldrin	34.0
5.	Heptachlor	24.0
6.	Endosulphan sulphate	55.0

IV. Conclusion

In general all the soil samples were found to contain considerable amount of pesticides and this is a matter of concern, There is utter need to create more awareness among farmers about toxic effects of synthetic pesticides, strict execution of restrictions on use of organic pesticides need to be pressed at all levels. Promotion of use of alternative pest controlling agent needs to be carried out to reduce the overall effect of toxic pesticides in long run.

V. Acknowledgement Daisy Bhat and P.padmaja are thankful to RDFGIT and RGPV for providing Facility to carry out this work.

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