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Research Article

Gas liquid chromatographic analysis of aldrin residues in certain tissues of a freshwater teleost *Clarias batrachus*

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Abstract: This paper presents the quantitative detection of Aldrin in the liver, kidney and gills of the fresh water teleost *Clarias batrachus* by Gas liquid chromatography. The study was made after exposure of fish to a sublethal concentration of 170 ppm for 96 hrs, 15 days and 30 days. GLC has been particularly suitable for quantitative analysis of organo chlorinated pesticide residues GLC technique is applicable to nearly all volatile compounds the residues of the pesticides was present is very small amount say is microgram and some terms even lesser is nanogram level the method should be very sensitive. Liver was found in ten metabolites at different peaks. The higher concentration was found in 74.884 ng/L. Kidney was found in five metabolites in different peaks. Higher concentration was detected 99.1869 ng/L. Gills was found in two metabolites. The higher concentration was found in 4.417 ng/L. The results indicate as accumulation of Aldrin in these tissues.

Keywords: Gas Liquid Chromatography Fish, Aldrin.

INTRODUCTION

The impact of modern technology in agricultural growth and the rapid growth of industrial activities brought about increase in the manufacture and utilization of pesticides. Pesticides are biological, physical or chemical agents used to kill plants or animals that are harmful to men, (Munshi 1988) on the other side, use of pesticides has given rise to many serious problems. They have potentialities of affecting the non target life and environment diversity. These pesticides exhibit the phenomena of biomagnifications followed by bioaccumulation and these factors have far reaching consequences in the aquatic system specially with reference to flora, fauna and benthos Smith (1973); Singh (1985); Singh and Sahai (1986); Krishnamoorthy (1988); Nag (1992). The present research work includes a study of the accumulation and effects of organocholorine such as Aldrin insecticides on the liver, kidney and Gills of the fresh water fish *Clarias batrachus* by Gas liquid chromatography. Such a study is important in fisheries development and human beings because Fishes are important

human food stuff, and their sensitivily to toxic substances are the main cause for their selection as test animals in the present study other hand, GLC has been particularly suitable for quantitative analysis of Aldrin residues GLC technique is applicable to nearly all volatile compounds of the pesticides are present in very small amount. The study was made after exposure of fish to a sublethal concentration of 170 ppm for 96 hr, 15 days and 30 days.

MATERIALS AND METHODS

Live specimens of Clarias batrachus weighing 127.2 $\pm$ 0.31 gms. and 23.6 $\pm$ 0.02 cm. in length. They were acclimatized to the laboratory conditions for seven days, before starting the experiment. Application of the pesticide and bioassay used were the same as described in our earlier publication (Singh and Sahai 1984). Quantitative detection of the pesticide in the different tissue of the fish was done by GLC using the method of Kaphalia (1986) has been used. For this procedure the samples were prepared then compare and identified with authentic samples in following techniques.

(1) Extraction and Clean up - The tissues after removal from the fish were thoroughly washed. After washing each tissue is completely dried up in an oven. Thoroughly minced 2 gm. Each tissue of fish was homogenized with 7 ml. concentrated formic acid and to this added was 5 ml. n-hexane. The contents were Shaken in a mechanical Shaker for an hour. The solvent layer was isolated washed with glass distilled water and passed through the anhydrous sodium sulphate column and extracted with analytical grade acetone. A suitable aliquot of each extract was evaporated under nitrogen. The residues was dissolved in measured volume of analytical grade chloroform and a definite amount was injected into the gas liquid chromatogram (GLC) Pesticide residues were assessed by Pyenicam series 104 Gas liquid chromatogram.

(2) Column – For GLC operations, Glass column 150 cm. x 4 mm. packed with 3% ov – 1 – on diatomite (DB - 1707) was used.

(3) Carrier Gas - Iolar Grade - 1 nitrogen purified by passing though silica gel and molecular sieve to remove moisture and O_2 respectively.

(4) Temperature (C^0)-

1. Injector 194^0
2. Detector 200^0
3. Column 185^0

(5) Gas Flow Carrier - Nitrogen (Iolar II) Flow rate was 60 ml/min.

Chemical names of the studies compound are to be found in analytical references standard (Watts 1981).

RESULTS AND DISCUSSION

The results of quantitative analysis in the different tissues viz. liver, kidney and gills of *C. batrachus* after subjecting the fish to the Aldrin was as follows -

The results obtained in the present study was given in table 1, 2, 3 and Chromatogram A B C & D.

On liver, residues of the Aldrin were found in 74.884 ng/L. Liver was found in ten metabolites at different peaks. All the metabolites were detected by GLC after 1.102 minutes to 9.067 minutes. The Aldrin analysed in aldrin diol. Cis and trans-dihyro-aldrin, endo-endo aldrin, trans dihydro diol, Dieldrin, Photodieldrin, Isodrin, Synhydro-oxydieldrin, endrin and HCE were detected in liver. (Table 1 Chromatogram A)

The aldrin concentration in the kidney ranged between 99.1869/ng/L. Kidney was found in five metabolites at different peaks. All the metabolites were detected by GLC after 1.117 minutes to 10.42 minutes. (Table 2 Chromatogram B) The Aldrin analyzed in aldrin diol, Cis and trans dihyro aldrin,

endo-endo aldrin, trans dihydro diol and Dieldrin.

On gills residues of the Aldrin were found in 4.417/ng/L. Gills was found in two metabolites at different peaks. Both metabolites were detected by GLC after 1.12 minutes to. The Aldrin analysed in Aldrin diol and Cis and trans dihydro aldrin were detected in gill. (Table 3 Chromatogram C).

Aldrin is a broad spectrum chlorinated insecticide of the cyclodiene group. The great affinities of chlorinated pesticide residues for the tissues of fishes and rapid bio accumulation is primarily due to their Lipothilic nature and apolarity (Satyanarayan and Muthal 2007), Manzie (1980) identified eleven metabolites in the free state by Gas Chromatographin the urin of mammal occupationally exposed to Aldrin.

Liptake (1974), Sims et.al. (1977), Fowler and Elder (1978) and Singh and Singh (2008) found that the proportion of P. P-DDT and its metabolites in aquatic organisms were apparently related to the position of the organism in the food chain. Agrawal et. al. (1985) has also described the concentration of DDT and its metabolites in Fish. Sadhu and Mukhopadhyay (1985) reported that carbofaron accumulation occurred in the testes in a trace quantity. Sharma (1994) also noted in *C. punctatus*, that high accumulation of BHC residues in the gill, intestine and liver and maximum concentration of residues were noted on 30 days of experiment.

The results of the present study were similar to Ferrando et. al. (1992) results. These described the concentration of some OC and OP pesticides in some tissues of *A. angula.* some that comparable with these found *in A. anguilla* on exposure to some OC and OP pesticies (Ferrando et. al. 1992). In the present study, the pesticides bioaccumulation was quite high in all the tissue, especially in liver. This result which is probably due to be taken into amount is that this animal contains a high lipid level. Not only will the insecticides get into the body through the ingested Food but also with the water through the gills. And it is also possible that the hydrolysis of insecticides is faster and this may be due to its high physiological and metabolic functions because of the ability of these fishes to gulp air by accessory respiratory organs in stress conditions.

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