CONCENTRATION OF ORGANOCHLORINE CONTAMINANTS IN FINFISH FROM LAGOON WATERS OF WESTERN NIGERIA.

Unyimadu John Paul

Nigerian Institute for Oceanography and Marine Research, P.O.Box 12729 Victoria Island, Lagos, Nigeria.

ABSTRACT

This paper reports first data on the concentration of a range of organochlorine compounds (chloropesticides and DDT and metabolites in fish from Ologe lagoon and Kuramo water (Nigeria). In addition, samples from the Lagos lagoon were analysed, and the results were in agreement from results previously reported in the literature. Nine fish samples were analysed for 18 chloropesticides and related residues, as well as PCBs. Focused Open Vessel Microwave Assisted Extraction (FOV-MAE) was used and Gel Permeation Chromatography was performed before cleanup. 13 of the 18 compounds and PCBs were detected in all samples, but the concentrations were generally low (< 30 µg/kg, wet weight, ww), and relatively high (>3000 µg/kg, lipid weight, lw) indicative of a relatively contaminated ecosystems. p,p'-DDD, p,p'-DDE, and p,p'- DDT (sumDDT) were the dominant pesticides observed. Relatively high sumDDT concentrations were observed in fish sampled in 1999 from the Lagos lagoon (12.7-26.0 µg/kg ww) and 3350-3400 µg/kg lw compared to fish sampled in 2001 with range of sumDDT of 0.7-2.0 µg/kg ww and 38.5-585 µg/kg lw. The concentrations of sumDDT were generally higher than those of PCBs (PCB 28, 52, 101, 153, 138, 180), suggesting more anthropogenic effects of agriculture origin compared to industrial uses. The results are compared with results from other parts of Africa. The variations in the concentrations found, and possible sources and movement of the organochlorine contaminants are discussed.

INTRODUCTION

OLOGE LAGOON (BRACKISH) Lat. 6°8`& 6°5`N & Long. 3°3`& 3°7`E receives treated effluents from Industries and river flow. LAGOS LAGOON (BRACKISH) Lat. 6°22`&6°48N&Long.3°23`&3°40E, the largest in the Gulf of Guinea, with 12 million living in the catchment area, received inflows of rivers\waste. KURAMO LAGOON (BRACKISH) Lat.6°26`&6°32N & Long.3°18& 3°20E, impacted by domestic waste. Coastal Industries, small agricultural activities, river inflow + atmospheric deposition are sources of OCPs and PCBs.

METHODOLOGY

10 g Fish Tissue

(1) Homogenize in Mortar + 10g Na_2SO_4
(2) Extract with 60 ml Ethyl Acetate: Cyclohexane (1:1v\v)+αPDHCH twice in Microwave Assisted Extractor (FOV-MAE)
(3) Gravimetric Lipid Determination
(4) Gel Permeation Chromatography Ethyl Acetate: Cyclohexane (1:1v\v)

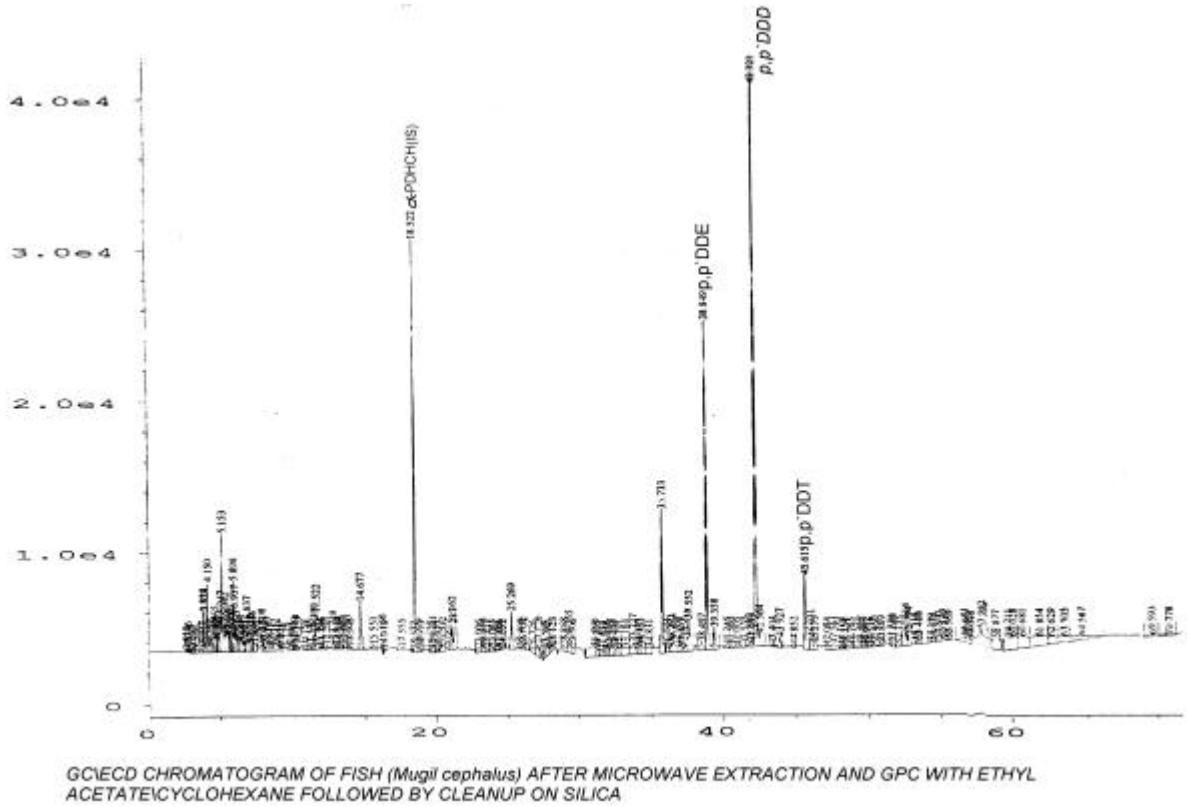
Adsorption Chromatography

(5) 3g Silica Deactivated 30% water
(6) Elution with 60 ml Hexane
(7) Rotary Evaporation to 0.5 ml

Table 1 GC-ECD Injection RESULTS

CONCENTRATION RANGE OF OCPs & PCBs IN FISH FROM LAGOONS (mg\Kg)			
Residue	**Kuramo Lagoon**	**Ologe Lagoon**	**Lagos Lagoon**
p,p`DDE			
lipid wt	131.6-135.6	11.7-166.4	45.0-422.1
fresh wt	0.46-0.48	0.20-0.56	0.34-3.23
p,p`DDD			
lipid wt	182.9-186.5	16.92-68.33	34.97-1824
fresh wt	0.64-0.66	0.23-0.28	0.38-13.6
p,p`DDT			
lipid wt	48.0	9.9-350	10.0-1140
fresh wt	0.17	0.17-1.18	0.21-8.73
SumDDT			
lipid wt	314-370	38.5-585.3	38.5-3400
fresh wt	1.10-1.31	0.66-1.31	0.66-26.0
ΣPCB			
lipid wt	162.9-206.3	16.3-80.2	1.36-162.9
fresh wt	0.37-0.73	0.27-0.28	0.20-1.10

AFRICA(LAKE VICTORIA KENYA)
SumDDT in Nile Perch (Lates nicoticus)
Lipid wt 4510 mg\kg
Fresh wt 460 mg\kg

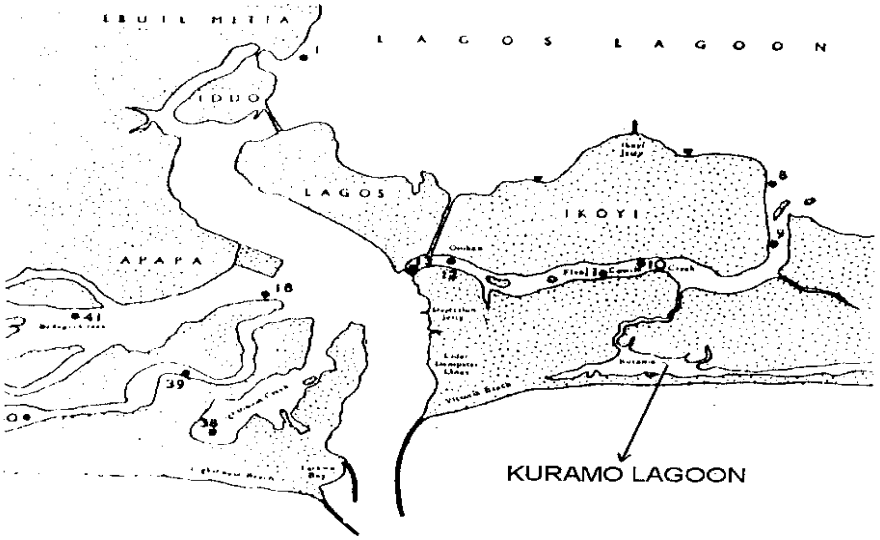


GC\ECD CHROMATOGRAM OF FISH (Mugil cephalus) AFTER MICROWAVE EXTRACTION AND GPC WITH ETHYL ACETATE\CYCLOHEXANE FOLLOWED BY CLEANUP ON SILICA

Figure 1(a)

CONCLUSION

- Fish of Western Nigeria in this research have low fat content (0.20%-2.20%).
- sumDDT higher than ΣPCB in all cases
- Agriculture impacts more than Industry.
- Levels of OCPs & PCBs low on ww but sometimes very high on lw.



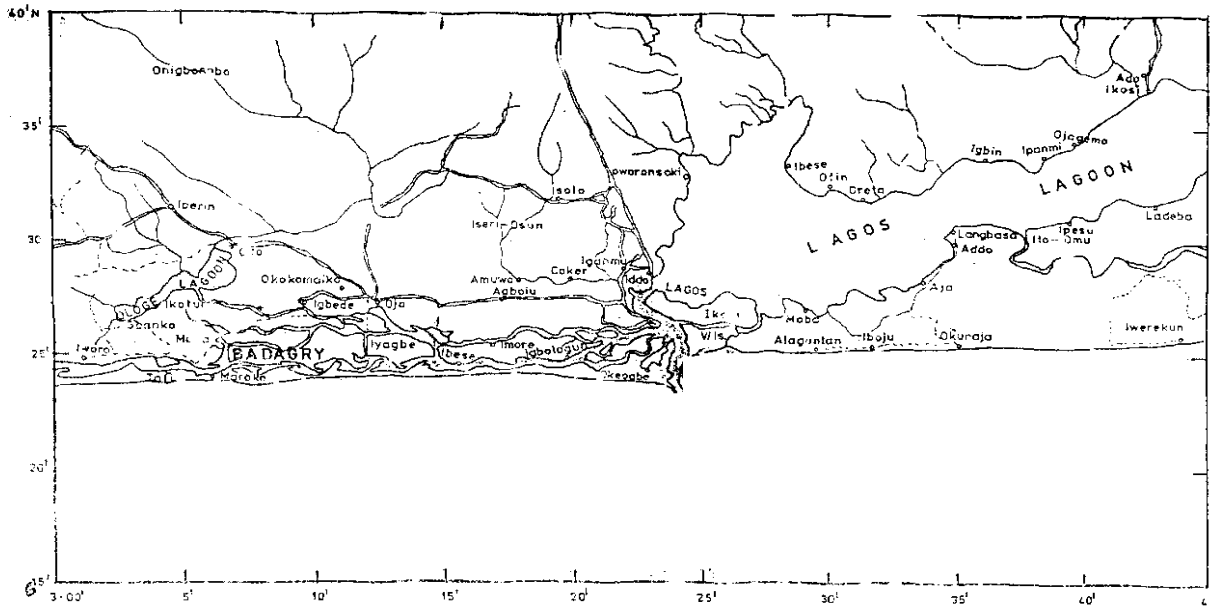


Fig. 1 Maps showing Western Nigeria Lagoons