

Identification of Methyl Parathion Pesticide residues in different Fish species of Mangalore (Karnataka) region.

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Abstract - Mangalore is a port city in Karnataka state, India. It is located between the Arabian Sea and the Western Ghats mountain range. The longitude and latitudes of Mangalore are 12°50'23"N 74°47'24"E. The use of pesticides for agricultural purposes is widespread in the Mangalore costal area. The biological indicators like fish help in the studies of aquatic pollution by pesticides. Fish species Catla, Common carp, Mrigal and Rohu were collected from Mangalore region in Monsoon season 2017. Fish samples were analyzed according to a modified method which is proposed for the HPLC determination for the Methyl Parathion. The extraction efficiency for the Methyl Parathion is between 90.8% and 96.4%. The Methyl Parathion pesticide residues are found more than MRL values.

Keywords: Pesticide residues, Methyl Parathion, Marine products, Mangalore.

I. INTRODUCTION

Reduction of the proliferation of pest and increase in food production, has made pesticides application in agriculture inevitable. Pesticides constitute one of the most hazardous groups of contaminants, posing potential risk to humans and other life forms. Thus deaths and chronic diseases worldwide are sometimes reported to have resulted from pesticide poisoning. The occurrence of pesticides residues in the environment is a great worry due to their tendency for long-range transport. Also their capacity to bio accumulate in food chain poses a threat to human health and the environment; Pesticides enter and pollute any component of the environment in a number of ways, including application, accidental spillage or through the unauthorized dumping of pesticide products or their containers. Contamination of water bodies for example is a major concern for fish and other aquatic organisms such as mussels, oysters, prawns and lobsters which are major sources of protein. Accumulation of pesticides in these organisms has become a serious public health issue worldwide. Fish are used extensively for environmental monitoring because they concentrate pollutants directly from water and diet, thus enabling the assessment of transfer of pollutants through the food web. Fish occupy different habitats in the ecosystem and have different feeding behaviors, thereby exhibiting different profile of accumulation of contaminants such as pesticides. ^[1]Mangalore's economy comprises industrial, commercial, agricultural processing and port-related activities. Mangalore city plays major role in fish exports and supply to Karnataka state. This study was conducted to identify Methyl Parathion pesticide residues in Catla, Common carp, Mrigal and Rohu.

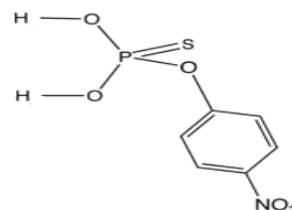


Fig. 1 Structure of Methyl Parathion

II. MATERIAL AND METHODS

Instrumentation: For quantitative estimation of Methyl Parathion in Fish samples, an isocratic peak HPLC instrument with chromosil C18 column, (100 mm x 4.6 mm, 5μ) was used. The instrument is equipped with a LC 20AT pump for solvent delivery and variable wavelength programmable UV-Visible detector, SPD-10AVP. A 20μL Hamilton syringe was used for injecting the samples. Data was analyzed by using PEAK software. techcomp UV 2301UV-Visible spectrophotometer (Hitach software) was used for spectral studies. Degassing of the mobile phase was done by using a Loba ultrasonic bath sonicator. A Denver balance was used for weighing of the materials.

Sample collection: The fish samples are collected from Mangalore region. Six fish samples are collected for each variety.

Extraction of pesticides from fish samples^[10]

20 g of sample was kept into a cone flask and thoroughly mixed with dichloromethane (30 ml) and sodium carbonate (15 g). Then the mixture was to standing 12 Hours in the well-sealed cone flask. After that the mixture was filtered through filter paper and then the tundish was washed with dichloromethane. The filtered liquid phase was contained in an open watch glass. When dichloromethane was dried out,

methanol (5 ml) was added to extract the DDVP. The extraction was repeated twice with methanol (2 ml). These extractions were mixed and diluted by methanol to 10 ml then filtered for analysis.

HPLC Conditions for Analysis of Methyl Parathion^[10]

For analysis of Methyl Parathion in tissue samples, HPLC with UV-detector set at 225 nm was used, with low sensitivity and specificity. So, HPLC with U.V detector is used to analysis of Methyl Parathion. In this study C18 reversed phase Chromosil column was employed at 25°C temperature Water and methanol P^H (5.3) as the mobile phase in 65:35 v/v ratio. The isocratic elution under the condition employed allows the separation of Methyl Parathion, Good separation and peak shape was obtained at flow rate of 1.0 ml/min.

Table 1. Chromatographic conditions of Methyl Parathion

S.No.	Condition	Parameter
1	Mobile Phase	Water and Methanol 65:35 (v/v)
2	Column	Chromosil, C18 (4.6 mm, 100 mm) column
3	Wave length	225 nm
4	Flow rate	1.0 ml/Min
5	Column temperature	25 c
6	Run time	10 min
7	Sample volume	20 µL
8	P ^H	5.3

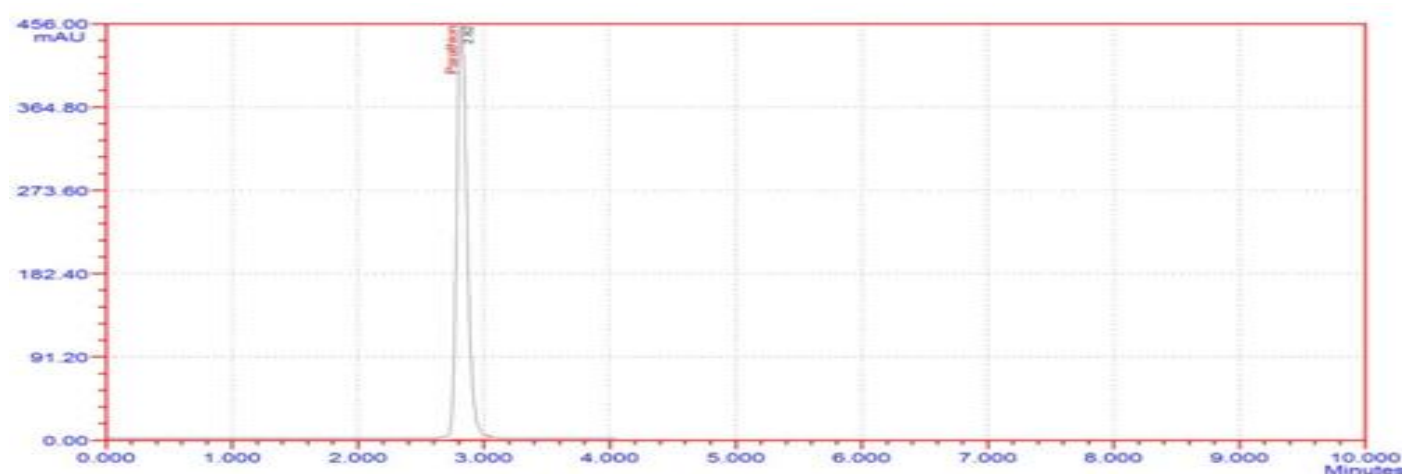


Figure: 2C HPLC standard Chromatogram for Methyl Parathion

III. RESULTS & DISCUSSION

Table.2 Concentrations of Methyl Parathion

S.No.	Location of sample collection	Fish Type	Concentration of Methyl Parathion µg/Kg
1	Mangalore	Catla	19.4± 0.54
2	Mangalore	Common Carp	15.5± 0.63
3	Mangalore	Mrigal	22.9 ± 0.47
4	Mangalore	Rohu	18.63 ± 0.81

The Methyl Parathion pesticide residues comprising were detected in the fish samples analyzed. The results are summarized in Table.2 The mean concentration of the Methyl Parathion detected in Catla samples were 19.4± 0.54, in Common Carpfish samples 15.5± 0.63, in Mrigal samples were 22.9 ± 0.47 and in Rohu samples were 18.63 ± 0.81.

IV. CONCLUSION

The study has revealed the presence of Methyl Parathion in different species of fish samples from the Mangalore region; the results were higher than minimum residual limits. The levels of Methyl Parathion pesticide residues found in this

study were well above WHO/FAO values. Analysis of health risk assessment revealed that Methyl Parathion had great potential for systemic toxicity to consumers. Regular monitoring is therefore required to control the levels of pesticide residues in the marine food.

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