Identification of Fenvalerate, and Methyl Parathion Pesticides residues in Marine products of Pondycherry Region

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Abstract:

After green revolution the use of pesticides increased very rapidly for all crops like Paddy, food grains, vegetables, fruits, cotton. In Monsoon season after raining the sprayed pesticides are contaminating the lake and canals. These marine products which are collected from these lakes and canals directly showing impact on human health. This study was conducted to identify Methyl Parathion and Fenvalerate residues in marine products.

Keywords: Pesticide residues, Methyl Parathion, Fenvalerate, Marine products, Pondicherry.

Introduction:

Pesticides are used on fruits, vegetables, wheat, rice, olives and canola pressed into oil, and on non-food crops such as cotton, grass, and flowers. The OP pesticides Methyl Parathion and Fenvalerate are commonly used on all fruits, vegetables, and wheat. Pesticides are used on crops that are fed to animals, although residue from pesticides is generally not found in meat or dairy products. The most common way most infants, children and adults are exposed to pesticides is by eating them on and in our food. Workers in agriculture and occupational settings touch and breathe in pesticides, putting them at risk for acute and chronic poisoning. Most studies of the health effects of pesticides have focused on occupationally exposed people, like farm workers and pesticide applicators. Acute OP pesticide poisonings result in symptoms like nausea, abdominal cramps, diarrhea, dizziness, anxiety and confusion, which can be quite severe but are often reversible. There have also been many studies in groups of people who work with pesticides but who have not experienced acute poisonings serious enough to result in these kinds of symptoms. These studies have found that chronic, lower dose exposure is associated with respiratory problems, memory disorders, skin conditions, depression, miscarriage, birth defects, cancer and neurological conditions such as Parkinson's disease. There have been fewer studies of people without known occupational exposures, but one study with a nationally representative sample showed increasing odds of ADD/ADHD for 8-15 year olds with increasing levels of OP pesticides metabolites in urine. This research study conducted for the identification of Pesticide residues in marine products.

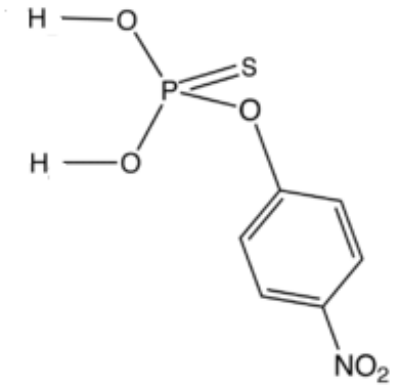

Figure. 1 Structure of Methyl Parathion

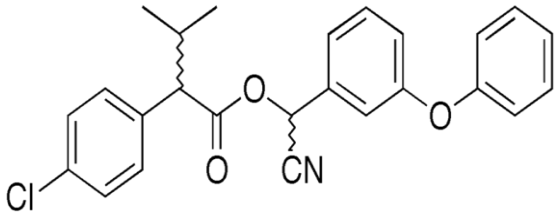

Figure. 2 Structure of Fenvalerate

Material and Methods:

Instrumentation: For quantitative estimation of Fenvalerate, Methyl Parathion in Fruit an isocratic peak hplc instrument with chromosil c18, c8 column , (100 mm x 4.6 mm, 5µ) (250 mm x 4.6 mm, 5µ), (150 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, crab and Prawn samples are collected from Pondicherry region mainly nearby Paddy cropping area.

Extraction of pesticides from Marine sample [17]

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 [18]

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 25C 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.

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

Table.1 Chromatographic conditions of Methyl Parathion

HPLC Conditions for Analysis of Fenvalerate: [19]

For analysis of Fenvalerate, in tissue samples, HPLC with UV-detector set at 239 nm was used, with low sensitivity and specificity. So, HPLC with U.V detector is used to analysis of Fenvalerate, In this study C18 reversed phase GEMINI column was employed at 30c temperature, Acetonitrile: Methanol, KH_2PO_4 (50:40:10 V/V/V) P^H 6.8 as the mobile phase. The isocratic elution under the condition employed allows the separation of Fenvalerate, Good separation and peak shape was obtained at flow rate of 1.0 ml/min.

S.No	Condition	Parameter
1	Mobile Phase	Acetonitrile: methanol-potassium dihydrogenate phosphate (50:40:10)
2	Column	GEMINI C18, 250 mm×4.6 µm
3	Wave length	239 nm
4	Flow rate	1.0 Ml/Min
5	Column temperature	30c
6	Run time	10 min
7	Sample volume	20 µL
8	P^H	6.8

Table.2 Chromatographic conditions of Fenvalerate

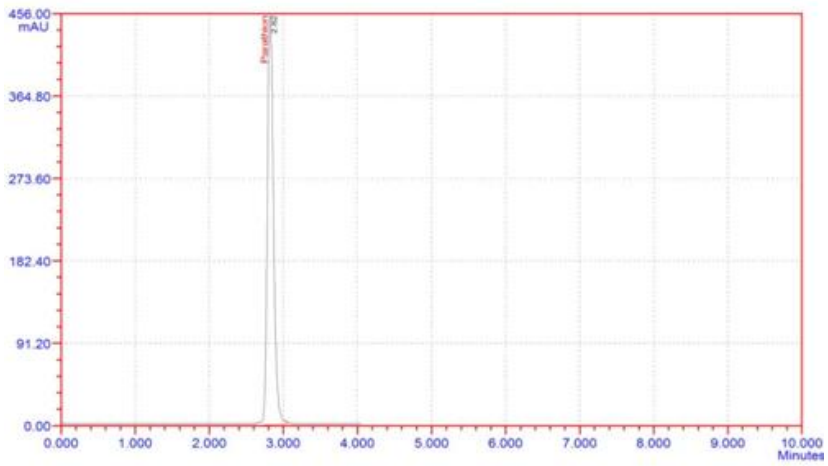

Figure: 3.C HPLC Chromatogram for Methyl Parathion

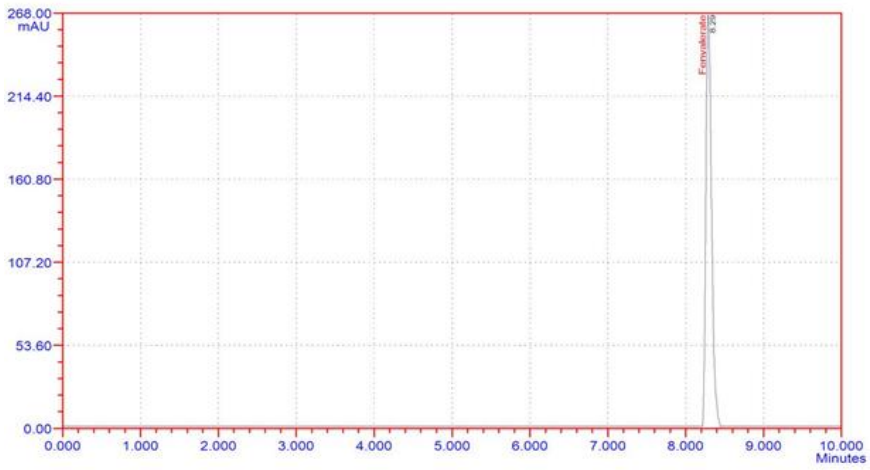

Figure: 4 HPLC Chromatogram of Fenvalerate

Results:

S.NO	Location of Sample collection	Fruit sample	Concentration of Methyl Parathion µg/Kg	Concentration Fenvalerate, µg/Kg
1	Velram pet	Fish	12.6± 0.21	6.55 ± 0.75
2	Mogamigai Nagar	Fish	14.2± 0.45	5.93 ± 0.96
3	Kaakaayanthope	Fish	7.52 ± 0.43	6.44 ± 0.34
4	Velram pet	Crab	7.63 ± 0.27	5.82 ± 0.75
5	Mogamigai Nagar	Crab	6.28 ± 0.76	5.36 ± 0.62
6	Kaakaayanthope	Crab	10.63 ± 0.42	8. 35 ± 0.0
7	Velram pet	Prawn	10.55 ± 0.32	8.26 ± 0.54
8	Mogamigai Nagar	Prawn	9.23 ± 0.63	8.00 ± 0.72
9	Kaakaayanthope	Prawn	7.66 ± 0.35	7.52 ± 0.11

Table.3 Concentrations of Methyl Parathion and Fenvalerate, in marine samples.

Discussion:

Methyl Parathion and Fenvalerate are present all three types of marine food samples. All samples have more than MRL values. Comparatively Methyl Parathion found more concentration than Fenvalerate. This pesticide residues are entering in to human body and causing so many diseases to human health. To avoid this type of issues farmers should take care after using pesticides to crops. They should make separate canals for stagnant water out flow.

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