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Determination of Pesticides in Water Sample of Sagar District MP

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Abstract – Pesticides have been utilized broadly by the farmers in India amid the last few decades. As Organochlorine (OCPs) and organophosphorus (OPPs) pesticides have been utilized ordinarily in the horticulture field, a direct and effective strategy for extraction for pesticides utilizing strong stage extraction (SPE) have been developed for detection of OCPs and OPPs in water. Seventeen chose mixes of OCPs and OPPs were removed from water utilizing RP-C18 cartridge and the states of extraction were upgraded. Every one of the pesticides were dissected utilizing gas chromatography-electron caught identifier (GC-ECD). Pesticide deposits identified in ordinary field change from 0.081 to 0.695gg/L which is marginally higher than those recognized in natural fields from (0.058 to 0.662) gg/L. This is expected for the most part from the truly utilized of pesticides in the plot no pesticide were utilized in the natural plot since the most recent three years. This plainly demonstrates the pesticide deposits in the dirt from recorded utilized can even now taint the natural field ecological.

Keywords: Pesticides, Water, Sagar.

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INTRODUCTION

Pesticides are utilized worldwide inside horticulture to secure yields and guarantee the amount and nature of the harvest. Be that as it may, concentrated and unseemly pesticides application can straightforwardly or by implication influence distinctive parts of nature, particularly water source. Other than the event of pesticides in drinking water, control of pesticide nearness in surface and groundwater is likewise essential. This principally alludes to the waste water, waterway and groundwater, considering the significance of natural insurance and sustenance security generation. The nearness of pesticide buildups in these grids may cause yield decrease and lessening item quality, because of its uptake.

Contamination of surface water with pesticides might be because of float or spillover from zones where they was connected, while the aftereffect of defilement of groundwater filtering into more profound soil layers affected by precipitation. This is especially evident in regions with sandy soil and concentrated pesticide application. Having at the top of the priority list, close to all, this issue, the European Association by Structure Order 2000/60/EC characterized the rules in securing and enhancing the nature of all water assets - streams, lakes, groundwater, beach front water, and so forth. Order 2008/105/EC is refreshed the Mandate 2000/60/EC and by Add X characterizes the Rundown of need substances in the field of water arrangement. The rundown incorporates 33 contamination - are pesticides, alachlor, atrazine, chlorfenvinphos, chlorpyrifos, diuron, endosulfan, isoproturon, simazin and trifluralin. As of now, usage of this direction in technique.

Other than the event of pesticide buildups in drinking water, control of their quality in waste water utilized in agrarian generation is critical. This basically alludes to the stream water and groundwater, considering that the water and soil quality in ordinary creation, yet particularly in natural agribusiness, are critical. The nearness of pesticide deposits in these grids may cause yield decrease and diminishing item quality, because of its take-up.

Considerring that acetochlor, alachlor and chlorpyrifos are still being used in agribusiness, it is vital to check they nearness in the earth. This mixes and its debasement items are extremely persistant and leaves buildups, particulary in water biological communities.

Acetochlor and alachlor are vital chloroacetanilide herbicides utilized on farmland for the control of broadleaf weeds and yearly grasses in push crops. Their concentrated use in contemporary agrarian generation amid earlier decades, has prompted the aggregation of buildups of alachlor and its metabolites in the earth, which imperils surface and ground water.

Alachlor [2-chloro-2,6-diethyl-N-(methoxymethyl)acetanilide] (Figure 1) has been enrolled since 1969 as a preemergence, early postemergence, or preplant joined herbicide for control of most yearly grasses or certain broadleaf species. Alachlor is most intensely utilized on corn, soybeans, and grain sorghum (Schwab et al., 2005).

Keeping in mind the end goal to supplant the more generally utilized corn herbicides, for example, alachlor, atrazine, and so on., acetochlor was enlisted for utilize. Acetochlor is a specific preemergent herbicide used to control wide range weed species in corn (Figure 1). Amid the primary season it was utilized, acetochlor was distinguished in rain and surface water in Minnesota at grouping of 0.01-0.25 pg/l. It was unsurprising, considering that acetochlor has a water solvency of 223 mg/l and it is decently to exceptionally versatile in soil.

Organophosphate insecticide chlorpyrifos (O,O-diethyl O-3,5,6-trichloro-2-pyridyl phosphorothioates,) is vital of water poison in spite of the fact that these insecticide is ordinarily utilized in agribusiness. It is the most broadly connected organophosphate insecticides and the most normally utilized insecticides in rural, for the most part. Chlorpyrifos based insecticides are widely utilized in horticulture, separately or in blend with other dynamic substances, to control unsafe creepy crawlies from various family - Aphis, Myzus, Mamestra, Leptinotarsa, Elateridae, Melolonthinae (Janjic and Elezovic, 2015).

METHODOLOGY

Sample : water samples were collected in 1L glass bottles from two different geographic points located in sagar district Madhya Pradesh . Samplings were performed from October- 2016 to March- 2017. Water samples were filtered immediately through a Whatman GF/F filter 0.7 pm, extracted and analyzed as soon as possible according to the optimized procedures (Zhou, 1996).

Materials: Seventeen individual reference explanatory review standard in particular aldrin, HexachlorocyclohexaneIsomers, Diazinon, Heptachlor, Malathion, Chloropyrifos, Heptachlor Epoxide, Endosulfan, Dichlorodiphenyl trichloroethane (DDT) family (4,4'- DDT 4,4'- DDE, 4-4'- DDD), Dieldrin, Endocrine and Endosulfan Sulfate were acquired from Sigma-Aldrich (St. Louise USA) and heptachlor epoxide was gotten from Supelco (Bellefonte, USA). All dissolvable utilized for test extraction and examination (methanol, n-hexane, CH3)2CO) were pesticide review (Merck, Germany). Resprep C18 cartridge (6mL, 500mg) was acquired (Restek, USA) and utilizing SPE (Complex) for test extraction. Natural free reagents water was gotten by utilizing a Milli-QEasy unadulterated Rodi framework .All pesticides were broken up in CH3)2CO at 1000pg/mL focus as the essential stock arrangement; the optional stock arrangement of 100pg/mL was set up from the essential arrangement. At that point the blended standard arrangement contained all the seventeenpesticides were set up by pooling aliquots of the individual unadulterated pesticide standard arrangement and after that weakening with CH3)2CO. For GC-ECD examination, a scope of standard blend stock arrangement containing 0.5pg/mL were set up in CH3)2CO and put away at <4°C. Readiness of various focus levels of stock arrangement is because of the affectability of the ECD finder. Standard arrangement of a blend of pesticides was crisply arranged day by day by volume weakening in CH3)2CO.

Instrument: Last assurance of focused mixes was accomplished utilizing GC-ECD, Varian CP3800 furnished with DB-5 hairlike section.

Extraction method: Pesticide blend was spiked into natural free reagent water 100pg/L fixation level. Cartridge Ciswas basically adapted with a blend of methanol and natural free reagent. Methanol is utilized as extraction dissolvable at various proportion. The cartridge was stacked with water test at planned stream rate. At last, the focused on mixes were eluted from C18 utilizing CH3)2CO taken after by n-hexane with the different proportions. Concentrated example was set under a nitrogen stream until dryness and reconstituted with 1 mL of n-hexane. The streamlining technique depended on past work (Wang, 2009) with a couple of adjustments on extraction method. Four factors in particular: molding, test volume, stream rate and the eluting proportion of focused mixes were upgraded in this examination .

Table.1. The Matrix Value of Optimization in This Study

Variables	Low	Middle	High
Solvent volume	1 mL	3 mL	5 mL
Sample volume	500 mL	750 mL	1000 mL
Eluting ratio (acetone: n-hexane)	2:8	5:5	8:2
Flow rate	0.5ml/min.	1.5ml/min.	3ml/min.

This method utilized one-variable at once, with each factor was examined independently. The proficiency of the extraction, fundamentally in light of pinnacle zone of the analytes. Water tests were separated under vacuum by utilizing glass film, and afterward the water tests were prepared utilizing a strong stage extraction (SPE) method. The cartridges were adapted with 5 ml of methanol taken after by 5 ml of Milli-Q water. Water tests (1.0 L) were gone through the cartridge at a stream rate of 3.0 ml min-1 under N2 weight. Following extraction, the cartridges were eluted with 5.0 mL of CH3)2CO taken after by 5.0 mL hexane. Tests were pre-thought under stream of nitrogen gas until the point that dryness then it is

trailed by including 1 mL n-hexane. At long last, 1pl was infused utilizing GC-ECD.

RESULT AND ANALYSIS

1. The seventeen pesticides chose, 14 OCPs and 3 OPPs depended on their being from various substance families material to GC-ECD assurance. The investigated pesticides cover an extensive variety of mixes utilized in farming especially as insecticides. Under the enhanced GC-ECD conditions; a standard division of the 17 focused on mixes was acquired. The recognizable proof of 14 OCPs and 3 OPPs were madeby standard arrangement maintenance time. The chromatogram of the 17 mixes in this examination was appeared in Figure.1

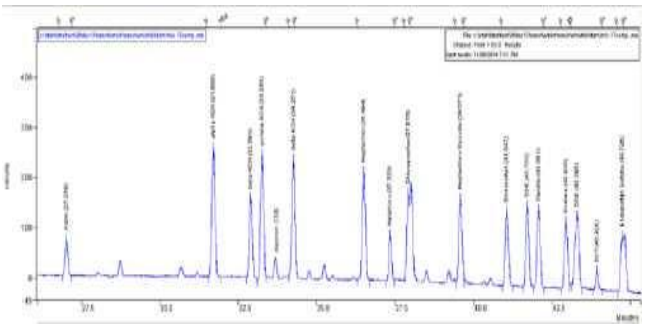

Figure.1. Chromatogram of 17 compounds by using GC-ECD

2. **Strong Stage Extraction System**: For the enhancement of the SPE-strategy, four parameters were examined including sorbent choice, molding step, test volume, stream rate and eluting proportion. Reliant on the watery framework, distinctive example volume were separated for identification in surface water, an example volume 1000 mL was observed to be adequate to get LODs>0.01 pg/L and for LOQs> 0.037 pg/L.

3. **Monitoring outcomes** : Waste water tests were taken from a few areas on the domain of Vojvodina amid 2017. The nearness of acetochlor was recognized in 92% of examined waste water tests, while alachlor established in 75% examples. The relating scope of acetochlor fixations was 0.02-0.41 qg/l and 0.05-0.78 qg/l of alachlor. Nearness of chlorpyrifos accomplished in all investigated water tests, in measure of 0.07-0.92 qg/l.

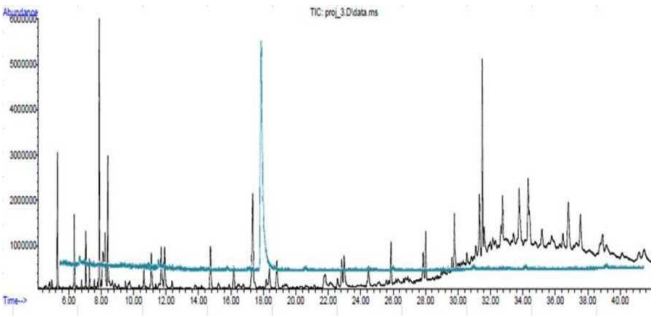

Figure 2. GC-MS chromatogram of water sample

Analysis : Some ofpesticide residuesin water test are surpassed the European Financial Commission (EEC) safe point of confinement (Mandate 98/83/EC)(< 0.1gg/L for any pesticide or <0.5gg/L for add up to pesticides)which are a-HCH, y-HCH, heptachlor, heptachlor epoxide, endosulfan, DDE, dieldrin and DDD from natural field and all OCPS with the exception of DDT from regular field.

Also, high recurrence of discoveries were watched for are a-HCH, y-HCH, heptachlor epoxide, DDE and dieldrin from both natural and regular field show that these pesticides were exceedingly utilized in the examination area.DDT was substantially less than DDD and DDE demonstrate the recorded of new utilized of DDT, there was no sign of new utilized of DDT.

The nearness of these pesticides can be credited to their broad use amid the 1960s, particularly in the rice fields. These pesticides especially OCPs corrupt gradually and gather in the dirt of the rice fields and are in this manner drained out into the amphibian arrangement of the encompassing region (Tan, 1992). This outcome demonstrated that pesticides are as yet being utilized in the paddy fields in the regions. In spite of the fact that Organochlorine pesticide has been prohibited since 2008 in numerous nations incorporating India for use in edit development, they might be utilized illicitly in creating nations like India as a result of the minimal effort, viability and accessibility (Azhani, 2012).

Trial of change (ANOVA) was performed on the aftereffects of pesticide buildups from natural and traditional fields. The outcome demonstrated that the convergence of the pesticide buildups in water tests from natural fields were not fundamentally not quite the same as those from ordinary fields (p>0.05) notwithstanding the non-utilization of pesticides in the natural fields. This is because of precipitation, regular procedures, for example, draining or the water system framework that upgrade the exchange of pesticide buildups from traditional fields to the natural fields amid planting

season (Aijmandi, 2010). Water stream in the paddy field likewise influenced the grouping of the pesticides. The centralization of pesticides in paddy plants at the water bay zone for the two fields possess hone zones were the most minimal contrasted with that in mid-field and outlet regions. This is on account of the perfect water from the delta regions weakened the pesticide buildups in the paddy plants. The procedure with the proximity of these synthetic concoctions in the paddy field and the general condition in Asia is in all probability a direct result of a mix of the relentless character of OCPs mixes and their proceeding, illicit, use by ranchers.

The apportioning of OCPs insecticides in water, dregs, and fish in the paddy field condition, credited to the solvency qualities related with these synthetic concoctions is shown in India (Abdullah, 1997).

This is very sensible by the comparable physiochemical qualities in their water system waters and likeness of the climatic conditions in the contemplated region (Ballesteros and Parrado, 2004). The nearness of these pesticides can be ascribed to their wide use amid the 1960s, particularly in the rice fields. These Organochlorine pesticides debase gradually and aggregate in the dirt of the rice fields and are accordingly drained out into the sea-going arrangement of the encompassing territories. At present, organophosphorus insecticides are utilized in light of the fact that the vast majority of the Organochlorine insecticides have been prohibited because of their poisonous quality, ingenuity, and bioaccumulation in nature (Textual style, 1993; Tan, 1992). These insecticides are transported into the ground water through filtering, diverting, coordinate spillage and wind float.

Table 4. Concentration Levels of Pesticides in Water Sample

Compounds	Organic Field			Conventional Field		
	Mean (pg/L)±SD	Range (pg/L)	FD (%)	Mean (pg/L) ±SD	Range (pg/L)	FD (%)
Aldrin	0.054± 0.004	ND-0.143	25	0.103± 0.004	ND-0.153	40
Alpha HCH	0.129± 0.006	ND-0.187	93	0.176± 0.007	ND-0.192	95
Beta HCH	0.073±0.005	ND-0.200	25	0.115± 0.025	ND-0.227	30
Gamma HCH	0.153± 0.024	ND-0.224	75	0.165± 0.005	ND-0.235	65
Diazinon	0.029± 0.007	ND-0.081	20	0.077± 0.012	ND-0.105	75
Delta HCH	0.094± 0.021	ND-0.224	40	0.165± 0.004	ND-0.268	40
Heptachlor	0.127± 0.006	ND-0.218	45	0.179± 0.003	ND-0.231	60
Malathion	0.030± 0.007	ND-0.101	20	0.066± 0.019	ND-0.109	60
Chloropyrifos	0.022± 0.009	ND-0.058	40	0.045± 0.025	ND-0.081	50
Heptachlor Epoxide	0.421± 0.015	ND-0.552	87	0.526± 0.017	ND-0.559	90
Endosulfan	0.251± 0.042	ND-0.370	70	0.355± 0.028	ND-0.389	95
DDE	0.152± 0.020	ND-0.255	93	0.195± 0.021	0.110-0.296	100
Dieldrin	0.167± 0.043	ND-0.270	81	0.254± 0.018	ND-0.274	95
Endrine	ND	ND	ND	0.386± 0.009	ND-0.663	30
DDD	0.452± 0.088	ND-0.662	55	0.497± 0.068	ND-0.695	65
DDT	0.034± 0.010	ND-0.120	20	0.059± 0.001	ND-0.139	25
Endosulfan Sulphate	ND	ND	ND	0.107± 0.003	ND-0.146	35

CONCLUSION

All in all, the utilization of strong stage extraction gives a quick, proficient and reproducible technique for the concurrent assurance of different pesticides in waters. The two-advance extraction and fixation strategy limits deposit misfortunes and pollution issues. The effortlessness of the examination is supplemented by great GC-ECD results. The far reaching event of pesticide buildups in the common waters of the sagar district mp, India shows contamination because of agrarian action. In spite of the fact that pesticide buildups were recognized in water in the paddy regions were for the most part still inside as far as possible, there is a need to screen their quality keeping in mind the end goal to guarantee their security to consumers.This streamlined strategy connected for examination of need poisons in waste water tests. The comparing scope of acetochlor, alachlor and chlorpyrifos content in water tests was 0.02-0.41, 0.05-0.78 and 0.07-0.92 pg/l, separately.

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