

Determination of Organochlorine Pesticides Residues From Water Samples Collected From Lower Pus Dam, Veni (M.S.)

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ABSTRACT

The contamination of organochlorine pesticides (OCPs) from the selected surface water of Lower Pus dam at Veni in Mahagaon Tahesil of Yavatmal District was investigated to estimate the current status of Organochlorine Pesticide residues in water. In this study water samples were collected from various locations of lower pus dam veni in two seasons during the year 2019. The Endosulfan, DDT & DDE were the most frequent detected compounds in the water. The concentration of the Endosulfan pesticides residue was found in the range of 0.03-0.04 µg/L, DDT in the range of 0.04-0.05 µg/L and DDE in the range of 0.01-0.02 µg/L. The Chlorodane and Heptachlore pesticide residues were found in very low concentration.

Key Words: Organochlorine , Pesticides, Lower pus dam.

I. INTRODUCTION

Pesticide is a general classification that includes insecticides, rodenticides, fungicides, herbicides and fumigants. Although pesticides may be selectively toxic to these forms of life, they may still be toxic to man if food contaminated by them is ingested¹. Pesticides are known to be toxic to man¹. People have contradictory ideas about the meaning of pesticides. The dictionary defines pesticide as a substance for destroying harmful insects. The scientists are of the opinion that pesticides are chemical or biological substances that are designed to kill or retard the growth of pests interfering with the growth of crops, shrubs, trees, timber and other vegetation desired by humans. The term pesticide includes substances intended for use as plant growth regulators, defoliants, desiccants or agents for thinning fruit or preventing the premature fall of fruit¹. The substances applied to crops either before or after harvest to protect the commodity from deterioration during storage and transport also come under the category of pesticides ². Pesticides (herbicides, fungicides, insecticides) are widely used in the agriculture and industry around the world due to their high insecticidal activity. The presence of pesticide residues and metabolites in food, water and soil currently represents one of the major issues for environmental chemistry. Pesticides are, in fact, among the most important environmental pollutants because of their increasing use in agriculture³. The toxicity of pesticides to target and non-target organisms generally depends on the amount present in the environment, the proportion available to the biota and

ultimately in the amount actually encountered and absorbed by the organism⁴. Environmental distribution may lead to exposure of living organisms including man that are far removed from intended targets. Researchers have detected pesticides residues in heptachlor, endosulfane, Aldane, DDT and PCBs. Many of these pesticides have also been detected in sediment, aquatic plants and fish ⁵.

II. MATERIAL AND METHODS

Water samples were taken from 0.3 m below the surface with a pre-cleaned glass bottle. For sampling turbulent midstream position of water bodies were chosen to approximate mean concentration of river water. All foreign bodies were removed and the samples were stored in ice during transport and were kept at 4^o C in the laboratory until the solid phase extraction.

III. SAMPLE EXTRACTION

The procedure applied for the extraction of pesticides was similar to those reported by Laabs *et al* [6] and Steinwandter [7]. Water samples were extracted using ultrasonic extraction. Soxhlet extraction was done with 20 ml of hexane: dichloromethane (3:1) for 30 min. The extract was concentrated with the aid of rotator evaporator. Pre-elution was carried out with the HPLC methanol. The concentration solvent extract was then analyzed for Pesticides. The solvent of the mobile phase of the HPLC is methanol and water (1:1). This was prepared by measuring 250ml of HPLC grade methanol into a 500ml flask and made up with 250ml of distilled water. The HPLC model CECIL 1010 was switched on. The wavelength of the system was determined by using UV visible equipment. Little quantity of stock solution was diluted with methanol and its wavelength determined by scanning. A peak of 202nm was reached. The system wavelength was then set at 202nm and the sensitivity of the 0.05 nm of the UV detector component set. The flow rate was set at 1ml/min, afterwards, the purging of the system commenced by allowing the system to run for some time. The purging was carried out through a washing solution of 30% methanol, 70% water. Bubbling helium gas into the solution carried out degassing of the mobile phase was then set up and connected with HPLC system and allowed to run through the system of 20min. Each sample residues was dissolved in 1ml methanol. The extracted residues were loaded and injected into the valve of the chromatography system. The resulting chromatograph for each sample was printed out. The various retention time noted, concentration determined and recorded.

IV. RESULT AND DISCUSSION

Lower Pus dam is located at Veni in Mahagaon Tehasil, of Yavatmal district in Maharashtra state of India. This dam is totally surrounded by farm land. Farmer's of this region uses different fertilizers as well as pesticides to control the growth and population of pest for the well growth of crops which is very useful source of their economy and food. These pesticides can enter the reservoir through running waters and subterranean canals. These factors may lead to the contamination of this dam.

During the analysis of water we checked the some organochlorine pesticides. Table 1. shows result of organochlorine pesticides in water samples collected from three different sites of the dam. The Endosulfan, DDT & DDE were the most frequent detected compounds in the water. The concentration of DDT in the range of 0.04-0.05 µg/L and DDE in the range of 0.01-0.02 µg/L. The Chlorodane pesticide residues were found in

very low concentration. The pesticides heptachlor was not detected in the water samples in all site. It is showing that the farmers around the dam do not use them in large in their farming activities. Endosulfan, a broad spectrum contact insecticide and acaricide, is another pesticide used by many farmers. The associated figure for mean concentration of Endosulfan pesticides residue was found in the range of 0.03-0.04 µg/L.

Table 1: Levels of Organochlorine pesticides in water samples collected from Lower Pus dam.

Pesticide station	DDT			DDE			Endosulphone			Chlorodane			Heptachlor e	
	1	2	3	1	2	3	1	2	3	1	2	3	1	2
Summer season (2019)	0.01	0.03	0.04	0.01	0.02	0.01	0.03	0.02	0.01	0.01	ND	ND	ND	ND
Winter season (2019)	0.03	0.04	0.03	0.02	0.03	0.02	0.04	0.03	0.05	ND	0.01	ND	ND	ND
Average mean	0.02	0.035	0.035	0.015	0.025	0.015	0.03	0.02	0.01	ND	ND	ND	ND	ND
Standard deviation	0.014	0.0070	0.0070	0.0070	0.0070	0.0070	0.007	0.007	0.02	-	ND	-	-	-
Range	0.01-0.03	0.03-0.04	0.01-0.04	0.01-0.06	0.01-0.04	0.01-0.02	0.01-0.04	0.01-0.03	0.01-0.05	0.0-0.01	0.0-0.01	-	-	-

V. CONCLUSION

The analysis of water quality parameters of Lower pus dam reservoir showed that the values are well within the permissible limits. The result of study reveals that the quality of dam water is though fit for domestic, irrigation purpose and also for drinking purpose after some treatment and need continuous monitoring of physico -chemical parameters to improve the quality of water.

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