A STUDY ON THE CONTINUOUS USAGE OF PESTICIDE IN THE AGRICULTURAL FIELDS IN AND AROUND KOTHAMPATTY AREA WITH A SPECIAL REFERENCE TO THE IMPACT ON GROUND WATER AND SOIL

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ABSTRACT *The investigator has made an attempt to find the impact of pesticide pollution due to the discharge of pesticide waste water from the agricultural field in the kothampatty agro lands. The continues usages of pesticide in the agricultural fields affected the ground water in and around the study area. During the rainy session the pesticide percolate to the agricultural surface. Hence the ground water is polluted by percolation of the pesticide. Water quality analysis of surface water, bore water and open well water reveals that the water cannot be used for domestic and agricultural purposes. The high content of various parameters in the surface water and the ground water confirms the pollution caused by the continues usages of pesticide in the agricultural field in order to evaluate the physical and chemical parameters of water with help of BIS standard value. All the water and soil samples taken in and around the agricultural land. The solar evaporation tank is blessed in principle of black body surface which can absorb solar radiation more effectively than ordinary cement slab. The investigator observed the soil values with help of TNAU standard.*

Keywords: *Pesticide, Ground Water, TDS, TNAU.*

INTRODUCTION:

Pesticides can contaminate soil, water, turf, and other vegetation. In addition to killing insects or weeds, pesticides can be toxic to a host of other organisms including birds, fish, beneficial insects, and non-target plants. Insecticides are generally the most acutely toxic class of pesticides, but herbicides can also pose risks to non-target organisms. The primary benefits are the consequences of the pesticides' effects the direct gains expected from their use. For example the effect of killing caterpillars feeding on the crop brings the primary benefit of higher yields and better quality of cabbage. The three main effects result in 26 primary benefits ranging from protection of recreational turf to saved human lives. The secondary benefits are the less immediate or less obvious benefits that result from the primary benefits. They may be subtle, less intuitively obvious, or of longer term. It follows that for secondary benefits it is therefore more difficult to establish cause and effect, but nevertheless they can be powerful justifications for pesticide use. For example the higher cabbage yield might bring additional revenue that could be put towards children's education or medical care, leading to a healthier, better educated population. There are various secondary benefits identified, ranging from fitter people to conserved biodiversity. Groundwater pollution due to pesticides is a worldwide problem.

SCOPE AND OBJECTIVES:

Need For The Present Investigation

It is very clear that the environmental pollution is considered as the unfavorable change of water, air, soil and land. The pesticide effluent in agro field contains large amount of chemical based pesticide which is used for the preservation. The pollution level of the water resources proved to be threat to the human environmental condition and damage the ecological processes that sustain the production of food.

OBJECTIVES:

1. To analyses the Physico chemical parameters of bore well water.
2. To analyses access the water quality with special reference to presence of pesticide residue in ground water.
3. To analyses different parameter for the soil in Kothampatty.
4. To recommend suitable remedy for the prevention of pesticide pollution in ground water.
5. To remove the pesticide residue found in the wash water and bore well water, solar evaporation method using black kadappa stone tank was employed.
6. To study the impact of pesticide residue contaminated water in Kothampatty.

MATERIALS AND METHODS:

Location Of The Study Area

Dindigul district is an administrative region in the south of Tamil Nadu, India. The district was carved out of Madurai District in 1985. It has an area of 6266.64 km2 and comprises three Revenue Divisions, eight Taluks, and 14 Panchayat Unions. The district is bound by the Erode, Tirupur, Karur,and Trichy districs in the north, Sivaganga and Tiruchi districts in the east, the Madurai district in the south, and the Theni and Coimbatore districts and the state of Kerala in the west. The investigator has collected ground water sample in two directions to study the impact of the pesticide effluent in the ground water. Most of the water sample, during survey it was observed that the water becomes unfit for drinking with salty taste. The investigator has also collected soil sample from the study area.

Analysis of the Contaminated Water

S.NO	Parameter	Method Of Analysis
1	Colour	Visual comparison
2	Turbidity	Neplo turbidity meter
3	TDS	Conductivity method
4	Electrical conductivity	Conductivity meter
5	p^H	pH Meter
6	Total hardness	EDTA Titrimetric method
7	Calcium	EDTA Titrimetric method
8	Magnesium	Calculation from Total Hardness
9	Iron	Spectrophotometer
10	Ammonia	Nessler's Method
11	Nitrite	Spectrophotometer
12	Nitrate	Spectrophotometer
13	Chloride	Silver nitrate
14	Fluoride	Colorimetric meter
15	Sulphate	Turbidity method
16	Phosphate	Spectrophotometer

Solar Evaporation

- Kadappa tank - To evaporate the effluent by solar heat.
- Alum - To flocculate the effluent.
- Polyelectrolyte - To coagulate with effluent for sledge formation
- pH meter - To find the pH of the effluent
- TDS meter - To find the TDS of the effluent.
- Thermometer - To find the temperature of the effluent in the tank.
- Scale - To find the depth of the effluent in the kadappa tank.

Soil Constituents

To study distant wise distribution and accumulation of nutrients in the soil, the soil samples were collected at different sites around the Kothampatty area. The living part of the soil is just critical to plant growth as the physical soil structures. Soil microorganisms are the essential link between mineral reserves and plant growth.

RESULTS AND DISCUSSION:

Raw water quality and standards depends upon the end use. The four main uses are municipal, industrial, agricultural and recreational (fish and wildlife). As water quality is degraded day by day, so, it become very important to set the drinking water standards for the safety of water of our limited resources.

Different agencies have set environment standards for safe drinking water like Bureau of Indian Standards (BIS), World Health Organization (WHO), European Economic Community (EEC) etc.

The physical and chemical observations for the sample S_1, Eastern side of Kothampatty are tabulated in the above tabular column. The observation in the tabular column reveals that.

- The observed TDS 406 mg/l. But the CPHEEO - Std desirable limit is 500 mg/I. The TDS value obtained by Lab analysis is too low.
- The observed total hardness is 196 mg/lit based on lab analysis. But the CPHEEO-std desirable limit is 200 mg/l .
- The p^H is 7.2 based on lab analysis, which lies within the permissible limit.
- The observed values for ammonia NH_3 is 0.59. But the CPHEERO - std desirable limit is 0.05. Hence the water is chemically not potable for drinking purpose. The observed PO_4 is 0.37 mg/L . But the CPHEEO – std desirable limit is Nil. Hence the water is chemically not potable for drinking purpose.

Soil Test

S.NO	Parameters (ppm)	Standard value (ppm)	Experiment value (ppm)
1.	**Nitrogen**	75.00	113.00
2.	**Phosphorus**	25.00	15.00
3.	**Potassium**	60.00	270.00
4.	**Iron**	5.00	8.10
5.	**Sulfate**	6.50	2.20
6.	**Boron**	0.05	0.00

The different parameters for the soil sample of Kothampatty study areas are tabulated in the above tabular column. The observations in the tabular column reveals that.

- The experiment value of Nitrogen('N') 113.00 ppm. But the TNAU - Std desirable limit is 75.00 ppm. The Nitrogen value obtained by Lab analysis is too high.
- The experiment value of Phosphorus ('P') 15.00 ppm. But the TNAU - Std desirable limit is 25.00 ppm. The Phosphrous value obtained by Lab analysis is too low.
- The experiment value of **Potassium** ('K') 270.00 ppm. But the TNAU - Std desirable limit is 60.00 ppm. The Potassium value obtained by Lab analysis is too high compared to Standard value .
- The experiment value of Iron ('Fe') 8.10 ppm. But the TNAU - Std desirable limit is 5.00 ppm. The Iron value obtained by Lab analysis is too high.
- The experiment value of Sulfate ('SO_4') 2.20 ppm. But the TNAU - Std desirable limit is 6.50 ppm. The Sulfate value obtained by Lab analysis is too low compared to Standard value .
- The experiment value of Boron ('B') 00.00 ppm. But the TNAU - Std desirable limit is 05.00 ppm.

Solar Evaporation

S.NO	TIME (hr)	TEMPERATURE (^{0}C)	DEPTH (cm)	TDS (ppm)
	TANK-I	TANK-I	TANK-I	TANK-I
1	11 am	33	1.5	769
2	12 pm	35	1.4	820
3	1 pm	38	1.2	955
4	2 pm	40	1.1	1027
5	3 pm	37	1.0	1169
6	4 pm	36	0.9	1237

CONCLUSION:

The investigator has made an attempt to find the impact of pesticide pollution due to the discharge of pesticide waste water from the agricultural field in the Kothampatty agro lands. In order to evaluate the physical and chemical parameters of water, the pond water samples, and the ground water samples all the

sides were collected and analyzed for various water quality parameters and soil parameters. The bore wells in and around the northern side of the pond polluted with very high TDS and it is beyond redemption due to the higher limits of TDS, hardness, phosphate , ammonia and nitrate. All the water samples taken in and around the agriland are not chemically portable.

The solar evaporation tank is blessed in principle of black body surface which can absorb solar radiation more effectively than ordinary cement slab. The black coats natural Kadappa slabs obtained from the earth is used for construction of mini model solar evaporation tank in step wise position. The experiment values of soil from the kothampatty area is too high (N, P, Fe) compared to TNAU standard .The investigator observed the values with help of TNAU standard.

SUGGESTION AND RECOMMENDATIONS:

All the waste chemicals and waste water should be collected by the authorities or by efficient and dedicated private organization in a separate place and treated property before being discharged into water resources like river, lake, pond, wells and bore wells.

To suggest the area formers to use mild amount of Nitrogen and Potassium contain fertilizers in the kothampatty agricultural land.

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