PERSISTENCE OF DDT PESTICIDES IN RESIDUES OF TOBACCO CROP

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Abstract

Present study is carried out to deduct DDT from Tobacco plants. It is shown that 2.5ppm DDT was detectable at about 40 days past treatment period. It was suggested that DDT should not be use even at nursery stage.

Introduction

Tobacco is mainly grown in the Khaiber Pukhtonkhua. Though almost all the Organochlorine are a deregistered compounds and an un-recommended. However, it is experienced that farmers still spray their crops with persistent insecticides like DDT. Khan *et al* (1996) suggested that only small farmers are using deregistered products on locally consumable product. Iram *et al* (2009), Ahad *et al*. (2005)and Anwar *et al* (2012) have reported DDT from different Lake and soil of Khaiber Pukhtonkhua. Khan *et al*, (1996) have reported it on food produce in Pakistan. DDT is still an environmental hazard in these area. Therefore present study was conducted to explore persistence of DDT in residues of Tobacco plants.

Materials and Methods

The Tobacco nursery area was established in equal plots of 3x6 meters in replicates and these plots were sprayed with 25% DDT formulation @ 3 lit./acre. Untreated two plots were kept for the comparison and control. Method of extraction and cleanup was followed after earlier workers with some amendments (Akhtar and Hassan, 2002; Riazuddin *et al* 2011). Twenty five ml of the DDT formulations was diluted in 250 ml of water and the crop was treated with a suitable sprayer. Sample were drawn after 0, 2, 24 and 72 hours of the treatment then at 09, 27, 36 and 40 days of the post treatment respectively.

Experimental

a) Treatment: As indicated Randomised samples were drawn and dealt at regular interval. Crop samples were stored in a deep- freezer initially then the method of clean-up and extraction was carried out. The procedure, as described below, subsequently found to be workable and the sample have been successfully analyzed by GLC.

b) Extraction procedure: The extraction procedure was adopted from various methods from literature which was as follows.

   Though the Soxlet procedure was found effective (Tabassum *et al*, 2007) but simple blend procedure was found as good as Soxlet, where 10- 20 gm of sample in the 100 ml acetonitrile for 1-2 minutes was blended. For the purpose of separation the extract was filtered under vacuum, then filtrate was transferred to 1000 ml separating funnel and 100 ml petroleum was added ether after vigorous shaking for 1-2 minutes. Ten ml saturated NaCl solution in 500 ml water was added and again thoroughly mixing was achieved. It was left to stand to allow the layers separated. The aqueous layer was discarded and the solvent layer was washed with 100 ml water twice. Washings were discarded.
   Sample Cleanup: Anhydrous Na_2So_4 was added to solvent layer prior to clean- up. As a column was formed of florisil around 10 cm on the top of the column about 2cm anhydrous Na_2SO_4 was poured.

Then the column was rinsed with 35- 40 ml petroleum ether and a receiver was kept under it, the petroleum ether extract was transferred to the column, letting it pass through at a rate of around 5ml per minutes with 200 ml of eluting mixture of ethyl-ether and petroleum ether (6 :94) then eluted column at 5ml per minute with 200ml of eluting mixture of ethyl-ether (15:85). The collected mixture were concentrated to 10 ml and analyzed on GLC. Recovery with the fortified sample was 94%. Table 1 and 2 contains various parameters used in the study.

Table 1. GLC Parameters adjusted for the pp DDT

S.No.	Parameters	Features
1	Detector	Electron capture
2	Column material used	SE 30, 10% on DC 200 and 5% QF- 1 on chromosorb W.
3	Column Temperature	150 C^o
4	Detector Temperature:	175 C^0
5	Carrier gas Nitrogen	5.5 ml/min.
6	Sensitivity	3 $x10^{-10}$

Table 2. Various parameters field treatment of DDT on tobacco crop

Parameters	Rates
Dose:	3 liters/acre of DDT formulation containing 25% DDT
Spray solution:	25 ml/250 ml water sprayed per plot
Sample drawn:	After 0, 24 and 72 hours and 9,27 and, 36 days.
Size of plots:	3x 6 meters

Results and Discussion

The results obtained are presented in table3. The results indicated 03 ppm of DDT residues were detected at zero hours of post spray, thereafter it started increase slowly, while a level of 15 ppm (maximum) is reached in 24 hours. Then a gradual declining of DDT residue started and 4.0 ppm level is reached on 27^{th} days. >40 days after treatment insecticides residues could not be studied because of unavoidable lose of DDT – treated tobacco samples. It is suggested that since people in Pakistan, Particularly in northern parts, use homemade tobacco preparations for chewing purposes, therefore DDT spray even in nursery stages are not recommended due to its toxic nature.

Table 3. DDT residues detected at various post treatment periods

S. No.	Sample drawing time	DDT residues ($mg.kg^{-1}$)
1	Zero hours post spray	03
2	2 hours post spray	13
3	24 hours post spray	15
4	72 hours post spray	12
5	9 days post spray	10
6	27 days post spray	04
7	36 days post spray	03

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