



# Application of polynomials in computing weedicides in environmental samples

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## Abstract

This attempt is to determine the trace amounts of weedicides present in environmental samples by applying electro chemical technique adsorptive stripping voltammetry. Average amounts for ten replicates founded by using carbon nano tubes paste electrodes as working electrodes. a concept of polynomials in math matics and statistical concepts such as standard deviation and correlation coefficient and in all the findings in this investigation with higher degree of accuracy. Water samples of various areas are collected and investigated for weedicide residues before and after the application of weedicide.

Key words: weedicides, adsorptive stripping voltammetry, carbon nano tubes paste electrodes ,water samples.

## Introduction

although the fact that weedicides are useful for the control of various undesirable plants in crops at different levels. They are risky because they can poison the land, the water and the air. Some weedicides do disintegrate for a long time. These types of harmful chemicals regularly used to sustain yields [1-7].

When residual pesticides get into the environment they can remain poisonous and active for many years. If applied incorrectly or used in the wrong place, these chemicals may spread to other land areas and possibly to the water supply.

There are good reasons (advantages) pesticides are very effective. This means that nearly all the target pests which come in contact with these pesticides are killed. Results are quick. This means the pests are killed within a very short time.

Using weedicide can be an economical (cheap) way of controlling weeds and can be applied quickly and there is not the high labour cost which might apply to other methods of control, such as removing weeds by hand.

## Instruments

Electro analytical determinations conducted using a model Metrohm Auto Lab 101 PG stat (Netherlands). CNTPE was used as working electrode for differential pulse adsorptive stripping voltammetry and cyclic voltammetry. pH measurements were carried out with an Eutech PC\_510 cyber scan. Meltzer Toledo

(Japan) Xp26 delta range micro balancer were used to weigh the samples during the preparation of standard solutions. All the experiments were performed at 25°C.

## Reagents

All reagents used are analytical reagent grade. Double distilled water was used throughout the analysis. In the present investigation universal buffers of pH 4.0 was used as supporting electrolytes and are prepared by using 0.2 M boric acid, 0.05M citric acid and 0.1M trisodium orthophosphate solutions.

## Measurements and calculations

In this standard addition method, the voltammogram of the unknown is first recorded after which a known volume of standard solution of the same electro active species is added to the cell and second voltammogram is taken. From the magnitude of the peak height, the unknown concentration of species may be calculated using the following equations.

$$C \text{ (un known)} = \frac{C_s \times V}{V_t \times i_2} \times i_1$$

Computation of recoveries done by using quadratic polynomial concept of mathematics

$$F(x) = a_n x^n + b x^{n-1} + a_{n-2} x^{n-2} + \dots + r x + s \text{ (general)}$$

$$a x^2 + b x + c = 0 \text{ (quadratic)}$$

and for better determinations statistical concepts such as standard deviation and relative standard deviation and correlation coefficient were applied[23].

## Result And Discussions

Well resolvable and reproducible peak obtained for each sample is useful for the analysis of water samples. The optimum pH to get well defined peak for the detection is found to be 4.0. The peak current is found to vary linearly with the concentration of the pesticide over the range  $1.0 \times 10^{-5} \text{M}$  to  $1.0 \times 10^{-9} \text{M}$ . The lower detection limit was found to be  $1.02 \times 10^{-9} \text{M}$ . The correlation coefficient and relative standard deviation (for 10 replicates) obtained using the above procedure [8-15].

## Recovery experiments

A stock solution ( $1.0 \times 10^{-3} \text{M}$ ) of each sample is prepared in dimethyl formamide. In voltammetric cell, 1 mL of standard solution is taken and 9 mL of the supporting electrolyte (pH 4.0) is added to it. Then the solution is de aerated with nitrogen gas for 10 min. after obtaining the voltammogram, small additions of standard solution are added and the voltammograms are recorded under similar experimental conditions.

The optimum conditions for analytical estimation at pH 4.0 are found to be pulse amplitude of 25 mV, applied potential of -0.35V and scan rate 40 mVs.<sup>-1</sup>.

Water samples are collected from paddy fields which sprayed by the pesticides under investigation 48 hours after spraying the pesticides. These samples were filtered through a Whatman No.41 filter paper and Aliquots of water samples were taken in a 25mL graduated tube, to it buffer solution was added and analyzed as described above. The recoveries of samples obtained in water samples ranged from 51.00 to 57.00% and the results are summarized in Table 1.0.

**Table 1.0: Recoveries of weedicides in water samples**

Name	Amount added (mg/L)	Amount found (mg/L)	*Recovery (%)	Standard deviation
1.Aldicarb	5.0	3.15	53.75	0.07
2.Thiodicarb	5.0	3.36	59.00	0.05
3.Chlorpropham	5.0	3.31	57.75	0.16
4.Fenclorim	5.0	3.25	56.25	0.06
5.Isoxidefen	5.0	3.10	52.50	0.17
6.Fenclorazole	5.0	3.18	54.50	0.07
7.Phenothrin	5.0	3.22	55.00	0.15
8.Bynapycril	5.0	3.26	59.45	0.03

\*Average of 10 replicates

## Conclusions

In this approach statistical parameters and polynomial concept were used for the estimation of weedicide residues satisfactory applied to interpret the instrumental out puts without considerable errors. And during the estimations pollution arises due to heavy metal electrodes such as mercury electrodes is avoided by using carbon electrodes.

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