Indian Internet Journal of Forensic Medicine & Toxicology IndianJournals.com
ISSN 0973-1970, Vol.7, No.3 (2009)

Detection and identification of Acephate insecticide in visceral material: A case study

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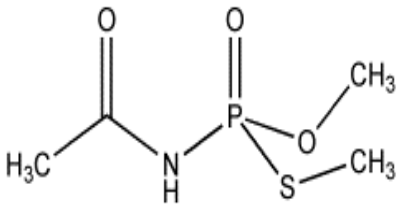
Abstract

The Acephate is an organophosphorous insecticide of broad spectrum used in field crops. The easy availability of Acephate is generally encountered in forensic cases. The aim of present paper is to describe symptoms, postmortem changes occur in a reported case of Acephate insecticide and detection and identification of insecticide in visceral material by T.L.C.

Key words: Acephate, Orthene, Acetamidophos

Introduction

Acephate is a broad spectrum Phosphoramidothioic acid, acetyl, O, S-dimethyl ester organophosphorous contact and systemic insecticide. Effective against alfalfa looper, aphids, armyworms, bagworms, bean leaf beetle, bean leaf roller, black grass bugs, bollworm, budworm, cabbage looper, cankerworms, corn earworm, cutworms, diamond back moth, grasshoppers, Brussel sprouts, cauliflower, celery, cotton, cranberries, dry beans, head lettuce, mint, peanuts, soybeans, and succulent beans. Acephate is used to control insects and aphids in ornamentals, where it has a reasonably broad spectrum. Chemically Acephate is O, S-Dimethylacetylphosphoramidothioate. Molecular formula $C_4H_{10}NO_3PS$ Colorless solid with White crystals its Melting Point 82-89^oC its Molecular Weight 183.16



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Brief study of the case

A case has been reported in which a person committed suicide by consuming Acephate pesticide. In the present study a routine and simple thin layer chromatographic method suggested for the identification of Acephate pesticide using Hexane and Acetone solvent system and spray reagent Palladous chloride as chromogenic reagent.

Post mortem findings

We have received a case of poisoning of a person. He was admitted in the hospital due to consumption of pesticide the common symptoms of pesticide poisoning was appeared. The patient was died on same day. The medical report suggesting patient unconscious, pupil is pinpoint. Post Mortem was conducted and PM Doctor reported both eyes are opened, pupils are dilated; froth coming out from nostril and mouth lungs, liver, spleen kidneys and stomach mucosa are congested, characteristic pungent smell present in stomach. The cause of death is asphyxia and duration is 24 hours. In the present communication Acephate pesticide detected in visceral material using simple T. L. C. method.

Experimental

All reagents were of analytical grade. Distilled deionized water was used throughout as and where required.

Extraction of Acephate from biological materials

About 50 g. viscera (I) pieces of stomach small and large intestine with its contents (II) pieces of liver, spleen, kidney and lungs said to be containing Acephate was taken. Material was cut into fine pieces and minced carefully, 100 ml of hexane and 10 ml of acetone was added. The contents were shaken in a separating funnel several times and solvent removed. The process repeated several times and solvent layers collected separately and passed through alumina (neutral) packed column. The purified sample is dried with anhydrous Sodium sulphate and used for further analysis.

Palladous chloride reagent

1.0 g. of Palladous chloride dissolved in 100 ml of water containing 0.5 ml of conc. HCl

Thin layer chromatography

Standard glass thin layer chromatographic plates were coated with slurry of silica gel g in water (1:2) to a thickness of 0.25mm and activated at 110^0C for one hour. The Microgram quantity of a commercial standard solution (1mg per ml in rectified spirit) of Acephate, and purified extracted visceral material were spotted on T.L.C. plate. The plate was than developed in pre saturated thin layer chromatographic chamber using hexane and acetone (6:4) solvent system. After the

solvent had traveled 10 cm up, the plate was removed from the chamber and allow it to, get dried in air, then sprayed with Palladous chloride reagent solution, which gave yellow colored spot at 6 cm.

Result & Discussion

The Thin layer chromatogram developed with the spray reagent Palladous chloride gives Rf value of extracted samples matched with the yellow coloured spot of the standard sample of Acephate at Rf- 0.6. Therefore the prescribed simple method can be used as routine identification of the organophosphorous pesticide Acephate in visceral material.

Acknowledgement

Authors are thankful to Dr. J. K. Agarwal Director F.S.L. Sagar M.P. and Joint Director Mr. S. R. Patidar R. F. S. L. Gwalior M. P. for providing necessary facilities.

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