



USE OF CHROMOGENIC SPRAY FOR DETECTION AND IDENTIFICATION OF FENPROPATHRIN FROM BIOLOGICAL MATERIAL

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ABSTRACT

Thin layer chromatography (TLC) is a simple, rapid and reliable technique usually used in forensic science laboratory for detection of poison in biological material. It can separate many complex mixtures in a short period of time. In this study an effort has been taken to determine Fenpropathrin by using Thin Layer chromatography. A chromogenic reagent Ortho-tolidine in acetone has been used for the detection of Fenpropathrin with Hexane:Acetone (8:2) as a solvent system for the separation.

KEYWORDS : Forensic science, Fenpropathrin, Ortho-tolidine, Thin Layer Chromatography

INTRODUCTION

Pyrethroid is a class of widely used pesticides. One widely used insecticide is fenpropathrin, which belongs to the pyrethroid group. Like natural pyrethrins, pyrethroid is an organic compound that is naturally produced by pyrethrum flowers. Pyrethroids are divided into two groups based on their chemical structure: type I, which does not have an alpha-cyano group on the phenoxy benzyl moiety, and type II, which does. It causes mortality and paralysis by interfering with voltage-gated sodium channels [1]. Fenpropathrin (α -cyano-3-phenoxybenzyl-2, 2, 3, 3-tetramethylcyclopropanecarboxylate, (Fen)), a relatively new, synthetic pyrethroid for controlling insect pests, has not been classified into the traditional classifications of pyrethroids. Fenpropathrin is an alpha-cyano pyrethroid but exhibits neurotoxicological responses in several symptoms [2]. fenpropathrin displays long-lasting effects in the water and can be highly toxic to fish and be accumulated in fish [3].

Experimental

Chemicals, Reagents and Solutions

All reagents used were of analytical-reagent grade. Standard fenpropathrin, O-tolidine (Himedia laboratories Pvt. Limited, Nashik, India) solution (0.5% w/v) was prepared by dissolving 0.5 g of O-tolidine in 100 ml acetone.

Extraction of Fenpropathrin from Biological Materials

A portion of about 100 g each of different types of biological tissues (pieces of stomach, intestine, liver, spleen, lungs and kidneys) containing Fenpropathrin was taken. Viscera were cut into fine pieces and minced carefully, 100 ml of Chloroform was added to homogenized visceral sample. The solvent was vigorously mixed with viscera and left for about 1 hour, and then the liquid was filtered out using whatman filter paper. The extract was transferred to an evaporating dish and the liquid portion was evaporated. The residue was dissolved in 1 ml chloroform and the solution was used for spotting.

Thin Layer Chromatography

Chromatography was performed on pre-coated Aluminium TLC plate (silica gel 60 F₂₅₄, Merck Ltd. Darmstadt, Germany) for detection of Fenpropathrin. The extract of blank viscera and Fenpropathrin containing viscera were spotted on TLC plate along with the spot of Fenpropathrin standard with fine capillary tubes. The plate was dried and developed in a presaturated tank containing the Hexane: Acetone (8:2) as solvent system. After development the plate was removed from chamber, dried at room temperature and then sprayed with 0.5 % of Ortho-tolidine in Acetone. After spraying the plate was kept in UV Cabinet. A grey colour spot observed at $R_f = 0.51$ (Figure 1)

RESULT AND DISCUSSION

Fenpropathrin is widely used insecticide which reacts with 0.5 % of O-tolidine in Acetone gives grey colour spot (Figure 1). The colour of spot remains stable. This spray reagent is stable, easily available and useful for the detection of Fenpropathrin from biological material. This spray method is economic, single step spray, reproducible and does not involve in any critical reaction condition. This reagent can also be used for the quantitative estimation of Fenpropathrin in biological samples. Hence, this reagent can be used routinely for detection of Fenpropathrin in biological samples.

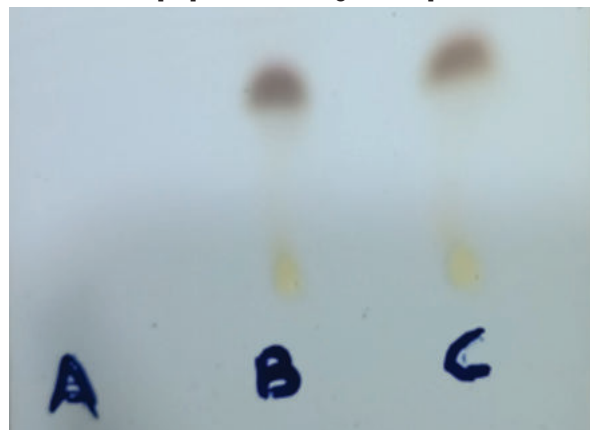


Figure 1. TLC Showing Spot of Fenpropathrin.

A) Blank Viscera Extract
B) Fenpropathrin poisoning Viscera Extract
C) Fenpropathrin standard

Acknowledgement

The Authors wish to thank Dr. S. V. Ghumatkar, Director, Forensic Science Laboratories, State of Maharashtra, Mumbai, India, for encouraging and supporting us.

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