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DETECTION OF PESTICIDES IN COMMON FRUITS OR VEGETABLES AVAILABLE IN DIFFERENT REGIONS OF BANGALORE CITY

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INTRODUCTION

Toxicology is primarily concerned with the study of the harmful consequences that any physical, chemical, or biological agent may have on humans, animals, and the environment in general. Forensic toxicology, a subdivision of toxicology, focuses on the utilization of regular toxicological methods and procedures to aid in the medico-legal examination of cases involving death, poisoning, and drug abuse. It includes analyzing numerous biological samples such as blood, urine, and other bodily fluids to detect the presence of any toxin, as well as individualizing the toxin discovered and determining the amount of toxin present in the individual's system. Among the toxins usually encountered are pesticides that are used to deter pest infestation in crops. These pesticides can cause serious health issues in the individuals who are exposed to them, which include confusion, lack of appetite, disorientation, and much more.

OBJECTIVE

The objective of this study was to detect the possible presence of pesticides in the vegetables and fruits available in

different regions of Bangalore city as well as in the ones purchased through online platforms by performing Thin Layer Chromatography or TLC. Five different vegetables and fruits were chosen, which included cabbage, carrot, tomato, grape, and spinach. Sample collection was done by dividing the city into four main regions, North, South, East, and West. A prominent online grocery shopping platform was also chosen along with these regions. The collected samples were then extracted by grinding their peels in a mortar and pestle in the presence of a hexane- acetone mixture. Since the control carbofuran pesticide was available in the granular form, extraction was carried out for carbofuran as well by grinding them in a mortar and pestle in the presence of methanol. The extraction was then followed by the preparation of the TLC chambers for which two different solvent systems were used as the control pesticides (hexane-acetone for malathion and hexane-chloroform-ethyl acetate-acetone for carbofuran).

While the prepared chambers were left for saturation, the spotting was done on the TLC plates using microcapillary tubes. The spots of the vegetable and fruit samples, along with the standard pesticide sample, were placed equidistant from each other on the spotting line, marked approximately 1 cm above the base of the plate. The spots were allowed to dry, after which the plates were carefully placed in the respective chambers. The TLC was run for 15-20 minutes, which was sufficient for the solvent to cover 80% of the run, after which visualization was done using Tollen's reagent (for malathion) and alkaline Fast Blue B reagent (for carbofuran). Spot formation was observed and the distance traveled by them was measured and used to calculate the Rf (Retention factor) values (ratio of the distance traveled

the solute to the distance traveled by the solvent) obtained for the vegetable and fruit samples which were then compared to the Rf of the standard pesticides and the results were interpreted. The values obtained were tabulated according to their regions.

RESULTS

The observations indicated that the Rf values of samples that were tested for the presence of carbofuran corresponded with the Rf values of the standard pesticide samples, indicating the possible presence of the pesticide in them. While the samples that were tested for malathion did not give results or values that corresponded to the value obtained for the standard pesticide. Since TLC is a screening method, sophisticated techniques such as GC-MS (Gas Chromatography-Mass Spectrometry) may be used for the confirmation and quantification of pesticides in vegetable and fruit samples.

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