



PESTICIDE ACCUMULATION IN VEGETABLES FOLLOWING REPEATED MULTIDOSE APPLICATIONS: AN ASSESSMENT OF PESTICIDE RESIDUES IN PARSLEY, GREEN SALAD, AND ONION

Maria DAIA¹, Alexandru Octavian DOMA¹, Romeo T. CRISTINA¹, Eugenia DUMITRESCU¹, Mihai FOLESCU¹, Daiana COCOȘ¹, Larisa RUSU¹, Florin MUSELIN^{1*},
¹ University of Life Sciences "King Mihai I" from Timisoara, Faculty of Veterinary Medicine

Abstract: Repeated and increased pesticide doses application have been observed in numerous countries, leading to their accumulation in food products. The study aimed to evaluate the behavior and residue levels of certain pesticides applied to parsley, green lettuce, and green onions. Four plots were used for each of the three vegetables studied: a control plot treated with distilled water, and three experimental plots—E1 with a normal concentration of 1%, E2 with double the concentration, and E3 with triple the concentration. Additionally, repeated sprayings were performed on days 1, 5, and 10. At the end of the application period, samples were collected and analyzed using gas chromatography-mass spectrometry (GC-MS). The tests also revealed that certain pesticides, such as azoxystrobin and epoxyconazole, had concentrations below the reference limits, indicating either a reduction in residues or that the applied doses were insufficient for detection. The main conclusion is that applying pesticides at standard dosages can lead to residue levels above legal limits. Therefore, adherence to recommended practices and careful monitoring are essential to ensure food safety.

• Introduction

The widespread application of pesticides in agriculture necessitates rigorous monitoring to identify potential contaminants in food products, as even low concentrations can pose chronic health risks upon sustained exposure.

Furthermore, uncontrolled pesticide usage can lead to residual levels in food that exceed maximum residue limits, potentially harming human health and leading to export impediments due to non-adherence to food safety regulations.

Therefore, understanding the behavior of pesticide accumulation under conditions of repeated and increased dosage is crucial for developing effective strategies to minimize their impact on agricultural products and, consequently, on public health.

• Material and method

- control lot (C) and three experimental lots (E1-E3). The control lot (C) received distilled water applications, while experimental lots E1, E2, and E3 were treated with the normal, double, and triple dosages of the pesticides, respectively, across repeated applications on days 1, 5, and 10. Subsequently, samples were harvested one day post-pesticide application.
- These samples were then meticulously prepared and analyzed using a Agilent 7890B Gas Chromatography-Mass Spectrometry to quantify the residual pesticide concentrations

Conclusions

Pesticide residues in leafy vegetables such as parsley and lettuce exhibit complex, nonlinear behaviors influenced by application dose, timing, and crop type. Some pesticides tend to accumulate excessively, surpassing safety thresholds, especially at higher doses, posing potential health risks. Conversely, certain pesticides show rapid degradation or limited uptake at elevated concentrations, indicating the presence of plant detoxification mechanisms.

• Results and discussions

