



Behavior of imidacloprid contamination in fruiting vegetables and their impact to human health

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ABSTRACT

The aim of this study was to investigate the degradation behavior and dietary intake risk for imidacloprid and its metabolites (imidacloprid-guanidine, imidacloprid-olefin and imidacloprid-urea) in fruiting vegetables (tomatoes and cucumbers) growing in greenhouse conditions. A simple, rapid analytical method for the quantification of these insecticide residues was developed using liquid chromatography coupled with tandem mass spectrometry. The dissipation of tested compounds was described according to a first-order kinetic equation with R^2 between 0.7130 and 0.9861. The results showed that the time after which 50% of the substance degraded was within the range 1.7–33.0 d. Residues of imidacloprid and its metabolites in tomato and cucumber samples varied from 0.001 to 0.521 mg/kg, respectively. Theoretical maximum residue contribution for imidacloprid was calculated and found to be well below maximum permissible intake (0.001 mg/kg) on tested fruiting vegetables on day 0 (1 h after spraying) for a single dose. No significant differences were found between the hazard quotient (below 3% of the acceptable daily intake after 9 d) values calculated for the residue of imidacloprid and for the sum of imidacloprid and its metabolites. The final residues of imidacloprid were much lower than the maximum residue limits. Our results indicate that harvested fruiting vegetable samples are safe for human consumption at the recommended dose (0.75 L/ha).

Keywords: Dissipation; Imidacloprid; Tomatoes; Cucumbers; Risk assessment

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