



Transformation products and degradation kinetics of chlorantraniliprole: laboratory and field studies in tomato samples applying LC-HRMS and non-targeted analysis

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Chlorantraniliprole is a novel synthetic anthranilic diamide insecticide developed by DuPont. It is an active substance authorised in Spain, and as such, it is commonly monitored in marketed agricultural goods. Nonetheless, its transformation products (TPs) are currently overlooked, even though they are likely to be present in foodstuff treated with chlorantraniliprole plant protection products (PPPs). Therefore, it is important to shed light on possible TPs originated from its degradation and monitor them, either those previously described in literature,¹ or novel identified, using a non-targeted approach (suspect screening and unknown analysis), as they may also end up in the food chain and pose a threat to human health.

To this purpose, laboratory and field studies in greenhouse were carried out in tomato samples to monitor the dissipation behaviour of chlorantraniliprole, as well as its degradation in TPs. Samples were carefully sprayed with an aqueous solution of Altacor[®] at different concentrations. Laboratory studies were performed at single (7.53 g chlorantraniliprole/L) and twofold (15.05 g chlorantraniliprole/L) dose for a total of 30 days at room temperature. On the other hand, field studies were carried out at the single recommended dose, up to 53 days. Tomato samples were processed by a solid-liquid extraction method using acetonitrile (MeCN) as extracting solvent (5 g tomato /5 mL MeCN), and analysed by ultra-high performance liquid chromatography coupled to Q-Orbitrap high resolution mass accuracy spectrometry (LC-Q-Orbitrap-HRMS), operating in Full Scan MS, and data independent acquisition (DIA) modes.

Concerning dissipation studies, for both laboratory and field studies, dissipation of chlorantraniliprole fitted to a biphasic kinetic model, regardless of the applied concentration. Additionally, 2 TPs of chlorantraniliprole were tentatively identified by a combination of a database created from literature research, and MassChemSite, which predicts possible TPs generated from a parent structure. IN-F6L99 was a common TP in both studies, being detected from day 0 (laboratory) and day 2 (greenhouse). The tentatively identified TPs were semiquantified by an analytical standard of chlorantraniliprole, due to their structural similarity, which yielded a result of around 3.2 µg/kg, whose toxic effects should be studied.

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