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Validation, accreditation, monitoring and risk assessment of pesticide residues in foods from Eastern Antioquia

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Towadays Colombian legislation uses an adaptation of the Codex Alimentarius MRLs to regulate pesticide residues according N to Resolution 2906 of 2007. This document states that annual revision of the MRLs is needed but this has not happened since its issuance due the lack of specific information of pesticide incidence in agricultural products. In this study 6 commodities were validated (SANCO/12571/2013 and NTC-ISO/IEC 17025) for multi-residue multi-class methods using QuEChERS sample preparation and GC-MS or UPLC-MS/MS for the analysis of regulated pesticides in golden berries (Physalis peruviana), lettuce (Lactuca sativa), potatoes (Solanum tuberosum), sugarcane (Saccharum officinarum), tamarillos (Solanum betaceum) and tomatoes (Solanum lycopersicum). These Latin American products are representative and widely produced in Antioquia (Colombia). Sample preparation followed the UNE-EN 15662 method: 150 mg of MgSO4, 25 mg of primary secondary amines, 25 mg of octadecylsiloxane (golden berries, potatoes, tamarillos and tomatoes) and 2.5 mg of graphitized carbon black (tomatoes). Golden berry, potato, and tamarillo extracts were injected using a programmed temperature-vaporizing injector. Lettuce, sugarcane and tomato extracts were analyzed by UPLC-MS/MS. The residues were validated over a range from 0.01 to 0.10 mg/kg in potato (10 pesticides) and sugarcane (5 pesticides); from 0.02 to 0.20 mg/kg in golden berry (28 pesticides), tamarillo (33 pesticides), and tomato (24 pesticides) and from 0.025 to 0.50 mg/kg in lettuce (15 pesticides). Validation included specificity (ions/transitions ratio), linearity (residuals $\leq 20\%$), bias (%RSD \leq 20%), trueness (%R 70-120%), LOQ and uncertainty assessment (\leq 50%). An initial risk assessment was enabled by monitoring 24 samples of each commodity (except sugarcane) in the municipalities of El Peñol, Marinilla and San Vicente Ferrer. Risks were found for goldenberries, potatoes and tomatoes, but it was only significant in tomatoes. The results obtained are expected to be useful in future improvement of the Resolution 2906 to establish suitable MRLs in Colombia.

Biography

Andrés Ramírez Restrepo is a Colombian chemist. He received several awards for academic excellence at his undergraduate studies (from Universidad Industrial de Santander) which he focused on the fragrance of tuberose flowers from Antioquia. His magister studies included accreditation of analytical methods to monitor pesticide residues in different local commodities. Since 2011 he is subscribed as researcher of contamination at trace levels of environmental compartments in the research group Grupo Diagnóstico y Control de la Contaminación of the Universidad de Antioquia.

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