



Determination of atrazine in environmental samples (soil and water) by UHPLC-MS/MS

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Atrazine is an extensively used herbicide in Argentina. Its solubility in water is 30 mg/L and the average half life in underground waters is of 283 days. Its moderate solubility and stability led to the findings of residues in air, soils, surface waters and underground waters. For this reason there is a great demand to determine atrazine and its degradation products at low ppt-ppb levels to satisfy environmental protection needs. This work deals with the optimization of the determination of atrazine in water and soil, by means of a rapid simple preparation procedure followed by determination using a UHPLC-MS/MS system, and its applications to measure real samples from the intensive agricultural Center Region of Argentina.

Sample preparation was based on modifications of a SPE procedure described by Min et al.¹. Performance aspects, mobile phases, ionization conditions and operation variables for fragmentation/detection in the triple quadrupole mass detector, in multiple reaction monitoring mode (MRM) were evaluated. Separation was done in a rapid resolution UHPLC column (C18, 2.1 mm x 100 mm, 1.7 µm), using a gradient elution of a mobile phase of water and acetonitrile, pH adjusted with 0.1% (v/v) formic acid. LOD and LOQ limits were 1 ng/L and 3 ng/L in water and 20 ng/kg and 50 ng/kg in soil matrixes respectively. Validation of methodology following SANCO/12495/2011 specifications were achieved. Matrix effects evaluation showed significant ion suppression only in soil samples.

Validated methodology were applied to study field samples of soil and surface waters: a) 21 samples of agricultural experimental soils from Córdoba Province, obtained at 5, 40 and 90 cm depth previously to atrazine treatment at concentration 48%, loading 2 L/ha, sampling at 7, 15, 30, 60 y 90 days after application. b) 48 samples of surface waters, collected monthly during one year in streams across agricultural zones of Santa Fe Province (Departments of Las Colonias and San Jerónimo): A° Santa María (31° 41' 01.63" S/ 61°10' 04.05" O), A° Corralito (31° 47' 13.44" S/61° 18' 40" O), A° Colastiné two sectors: 31° 54' 36.80" S/61° 08' 49.54" O y 31° 01'02.15" S/60° 59'24.97" O, the last one in the nearby to Río Coronda.

[1] Min, G.; Wang, S.; Zhu, H.; Fang, G.; Zhang, Y. *Science of the Total Environment*, **2008**, 396, 79-85.

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