

## **Seasonal and spatial dynamic of current-use pesticides (CUPs) in an Argentinian watershed.**

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The Argentinian Pampa region is the major agricultural zone, in which, the agricultural lands are strongly linked to surface waters. However, Argentina has not regulation for most of the current -used pesticides (CUPs) in surface water to protect the aquatic life. The objective of this work was to study the seasonal and spatial variations of CUPs in surface waters of “El Crespo” stream, and to determine the maximum levels reached to evaluate the possible impact on aquatic life. “El Crespo” stream is only influenced by farming activities, with intensive crop systems upstream (US) and extensive livestock production downstream (DS). It is an optimal site for pesticide monitoring studies since there are no urban or industrial inputs into the system. Water samples were collected monthly from October 2014 to October 2015 in the US and DS sites by triplicate using 1 L polypropylene bottles and stored at  $-20^{\circ}\text{C}$  until analysis. The samples were analyzed using liquid chromatography coupled to a tandem mass spectrometer (UPLC-MS/MS). The most frequently detected residues ( $>40\%$ ) were glyphosate (GLY) and its metabolite amino methylphosphonic acid (AMPA), atrazine, acetochlor, metolachlor, 2,4-D, metsulfuron methyl, fluorocloridone, imidacloprid, tebuconazole and epoxiconazole, which are used in the crops cultivated in the area (i.e. soybean, potato, maize and wheat). Individual analysis showed that the herbicide GLY and its metabolite AMPA presented seasonal and spatial variations. The highest concentrations of GLY and AMPA were detected in US site during spring 2014 ( $2.09 \pm 0.39$  and  $1.13 \pm 0.56 \mu\text{g/L}$ , respectively) and in DS during summer 2015 ( $1.06 \pm 1.02$  and  $0.20 \pm 0.23 \mu\text{g/L}$ ). Comparing total CUPs concentration between sites, a significant increase in UP site during spring 2014 ( $4.03 \pm 0.43 \mu\text{g/L}$ ) in relation to DS ( $1.54 \pm 1.17 \mu\text{g/L}$ ) was observed, may be due to pesticide applications during fallow and transport via surface runoff. Data generated in the present research could be used for evaluating the possible impact of pesticide mixtures on aquatic life and for regulation guidelines.