

## **Retention of antibiotics in soils: influence of biosolid aging**

**GHINWA MORTADA<sup>1</sup>, PROF. EMMANUEL GUILLON<sup>1</sup>  
AND STÉPHANIE SAYEN<sup>2</sup>**

<sup>1</sup>Reims Champagne-Ardenne University

<sup>2</sup>Reims Champagne-Ardenne University ICMR UMR CNRS  
7312

Presenting Author: [ghinwa.mortada@univ-reims.fr](mailto:ghinwa.mortada@univ-reims.fr)

The world population growing leads to the increasing production of biosolids worldwide which require their disposal. As they are rich in nutrients and organic matter, biosolids are commonly used as soil amendment to improve soil properties and reduce the need for fertilizer application. However, they may also pose environmental risks by introducing, into amended soils, various organic pollutants including pharmaceuticals and metallic trace elements. Once in soils, depending on their mobility, these contaminants can be transferred to the water bodies and taken up by crop plants. Among these contaminants, fluoroquinolone antibiotics are frequently detected worldwide and recognized at high contamination risk in amended-soils<sup>1,2</sup>.

. Therefore, a better knowledge of these contaminants behaviour in amended-soils is needed for a better assessment of their mobility and release.

In this context, this study aims at investigating the adsorption on soils of ciprofloxacin and enrofloxacin, two fluoroquinolone antibiotics, widely used in human and veterinary medicine, respectively. We investigated the influence of (i) soil physico-chemical properties/composition, (ii) biosolid application, and (iii) biosolid aging, on the adsorbed amounts and thus on their mobility in soils. As these pharmaceuticals are known to form complexes with metals<sup>3</sup> present both in soils and biosolids, likely to modify their mobility, we compared the antibiotic adsorbed amounts in absence and in presence of three selected metallic trace elements, Ni(II), Cu(II) and Zn(II).

1 A. de la Torre, I. Iglesias, M. Carballo, P. Ramirez, M.J. Munoz, *Sci. Total Environ.*, 2012, 414, 672-679.

2 P. Verlicchi, E. Zambello, *Sci. Total Environ.*, 2015, 538, 750-767.

3 M. Graouer-Bacart, S. Sayen, E. Guillon, *J. Colloid Interface Sci.*, 2013, 408, 191-199.