

# Occurrence and fate of antibiotics in soils fertilized with manure and evaluation of their persistence and potential to migrate to groundwater bodies



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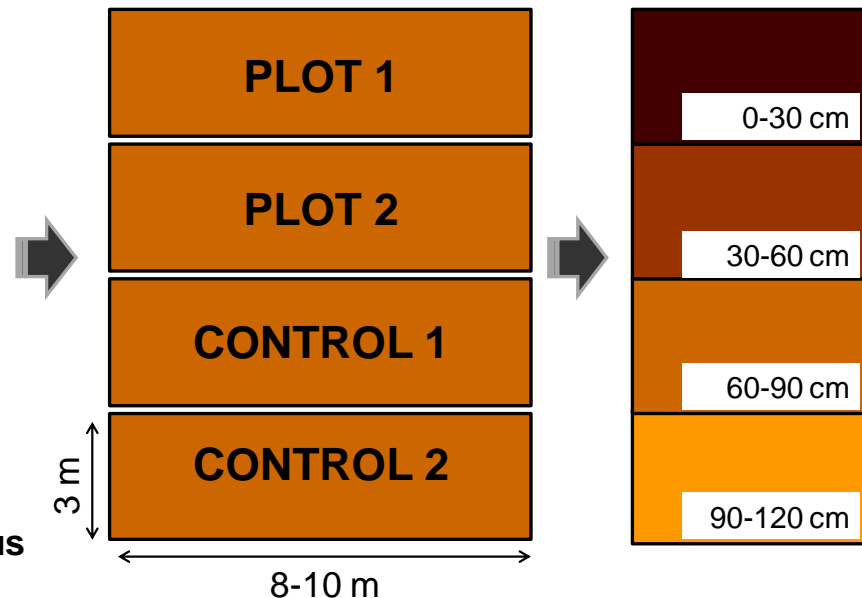
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# Goals and field experiments

**GOAL OF THE STUDY:** investigate the occurrence, distribution and fate of **40 multiple-class veterinary antibiotics and pharmaceuticals** in manure and soils fertilized with the animal waste to: (i) identify the pollutants that accumulate in soil over time and (ii) those with the highest mobility and that are more liable to leach to groundwater bodies, deteriorating the quality of aquifers.



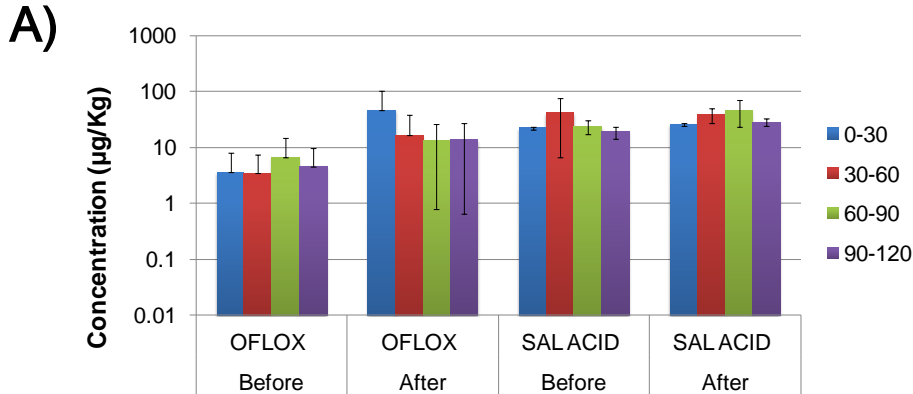
Soil texture: deep, sandy loam, calcareous



Plots fertilized with 170 kg N/ha with: A) cattle manure (2); B) swine slurry (2); non-fertilized controls (2)  
Samples taken prior (December 2015) and after (February 2016) fertilization at four soil depths  
Fields cultivated with wheat and barley, alternatively, since 2001

# Preliminary results

## SOILS FERTILIZED WITH CATTLE MANURE (A) AND SWINE SLURRY (B)



- Three compounds detected in cattle manure amended soils. The anti-inflammatory flunixin (not shown) was detected in samples after fertilization at 0-30 cm depth at  $0.09 (\pm 0.05) \mu\text{g/Kg}$

- Eight pharmaceuticals were detected in swine slurry fertilized soils. The antibiotics tilmicosin and tiamulin were also found in soils prior and after fertilization (data not shown) at low concentrations ( $<3 \mu\text{g/Kg}$ )

