



Prioritisation of veterinary pharmaceuticals prior to a monitoring campaign into water resources and drinking water: Case of Brittany, an intensive husbandry area

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ABSTRACT ICRAPHE

Prioritisation of veterinary pharmaceuticals prior to a monitoring campaign into water resources and drinking water: Case of Brittany, an intensive husbandry area

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Background and objectives:

Pharmaceuticals residues are nowadays of growing concern, especially in aquatic environments. Numerous and detailed researches have been conducted on human pharmaceutical residues at national and european scale, while occurrence of veterinary pharmaceutical residues remains still largely unknown.

Brittany is a region subjected to high animal husbandry pressures. Veterinary pharmaceuticals residues can enter the environment directly or indirectly during pastures or spreading of animal manure on soils. Thus, aquatic environments in Brittany are sensitive spots, potentially contaminated by a lot of veterinary residues, such as antibiotics or antiparasitic drugs.

The project aims at realizing an overview of the contamination (types molecules and levels of concentrations) of raw water resources subjected to a strong agricultural pressure, and into drinking water obtained from those resources.

In order to realize a monitoring study during one year, the first step was to perform a prioritization of veterinary pharmaceuticals, to select the veterinary pharmaceuticals which are the most susceptible to reach and to be detected in the aquatic environment.

Method and Results:

A preliminary list composed of 73 veterinary pharmaceuticals based on the REMEDES project (ONEMA 2013-2015) and on the studies of ARS and DREAL in 2013 was used. Four criteria were considered to realize this prioritization.

First, the potential to reach the environment which was decomposed into the animal target (aquaculture or livestock or pets), the administration route (topical application versus other

administration routes), the usage and veterinary practices in Brittany and the behavior during storage of manure and slurry prior to spreading into land.

Secondly, the metabolism was investigated. According to the metabolic rates obtained from ANSES data, it was decided to consider the parent compound or the main metabolite or both.

The third element to be investigated was the fate in the environment and ability of the molecules to run off or leach from soil to water, and their behavior (biodegradation, photolysis, sorption to sediments...) once in water resources. The last criterion corresponds to the analytical feasibility.

This prioritization allows a classification in groups of different levels of criticality toward the contamination of water resources. The veterinary pharmaceuticals in the first three groups were selected for the analytical development and to be monitored during a sampling campaign from September 2016 to September 2017.

Discussion and conclusion:

Prioritization was a complex task when concerning veterinary pharmaceuticals, indeed there is a lack of information concerning the environmental fate of the veterinary pharmaceuticals residues. Some families were extensively studied such as the sulfonamide antibiotics or tetracycline antibiotics, but information is still scarce for antiparasitic drugs or anticoccidians for example, while those veterinary medicines are widely used in intensive livestock areas like Brittany.

Then, this work highlights the fact that the choice of veterinary molecules regarding their potential to reach the aquatic environment has to be performed at a regional or local scale. Indeed, the usage of veterinary medicines can differ deeply between several regions and even between veterinarians.