

Livestock pharmaceuticals in agricultural streams: A scoping study

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During the past few years there has been a growing concern over the occurrence of pharmaceuticals in surface waters and their effects on humans and other organisms. Research has shown that some of these compounds resist biodegradation (e.g. Dietrich et al. 2002) and standard wastewater treatment facilities do not eliminate large portions of these compounds. The impacts, however, of trace amounts of pharmaceuticals in surface waters on ecosystems and human health is not currently known.

Pharmaceuticals are commonly used in the livestock industry for growth promotion, disease prevention and disease treatment. As with human pharmaceuticals, there is limited knowledge on fate and transport of parent drugs and their metabolites in the environment. Many compounds are excreted virtually intact. Studies have demonstrated that persistent pharmaceuticals can reach receiving water bodies through runoff and leaching of manure (e.g. Yang and Carlson, 2003).

The objective of this study was to determine the concentration and frequency of some commonly used livestock pharmaceuticals in streams with agricultural activity in their watersheds across Alberta. A list of target analytes was established based on usage, treatment type, laboratory capabilities and potential impact to the environment. Samples were collected monthly and following storm events in 23 streams during the summer and fall of 2005. The streams drained watersheds with varying agricultural intensity, climate and runoff potential across the province. Over 100 water samples were analyzed for 27 compounds using a liquid chromatograph coupled with a tandem mass spectrometer.

Implications: Results from this study will provide baseline information on livestock pharmaceuticals, an important first step in understanding the source and any potential effect of pharmaceuticals on the province's bodies of water.