The role of storm flows in concentration of pesticides associated with particulate and dissolved fractions as a threat to aquatic ecosystems - Case study: the agricultural watershed of Save river (Southwest of France)

Measurement of the fluxes of pesticides was carried out for a year, ending in March 2009, in the Save catchment, in the vicinity of Toulouse. The hydrograph separation technique was used to evaluate the respective contribution of stormflow and baseflow in transport of 12 pesticide molecules. Transport of over 59% of pesticides and their controlling factors such as total suspended matter (TSM), particulate organic carbon (POC) and dissolved organic carbon (DOC) occurred during storm periods. Hysteresis patterns could be observed in the concentration-discharge relationships only for some molecules between rising and falling periods of the storm hydrograph. Clockwise hysteresis was noticed for low to moderately soluble pesticide molecules and for particulate fractions, which explains the role of surface runoff in pesticide displacement. In contrast, anticlockwise hysteresis was registered for soluble molecules and dissolved fractions, explaining the role of subsurface flows and soil leaching processes. The important role of TSM, POC and DOC in pesticide transport was clearly established. We also came to the conclusion that the role of stormy periods in pesticide movement and their controlling factors worked as a threat to aquatic ecosystems. And there was a positive relation between riverine TSM, POC, DOC and pesticides according to pesticide properties.

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