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A STUDY OF ACIDIC HERBICIDE DESORPTION KINETICS IN RUNOFF FROM URBAN HARD SURFACES BY GC/MS

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The herbicides 2,4-D, MCPA, and dicamba are used routinely in urban weed control adjoining roads and stormwater drains. During application, herbicides are likely to be sprayed directly onto concrete and asphalt surfaces, where they are able to be directly and efficiently transported to surface waters by runoff in a rain event. The predominating theory for the mechanism governing overland flow of pollutants in urban environments is the physical particle mass flow model that describes turbulence and shear as the forces transporting pollutants from surfaces. To support an alternative chemical theory based on a non-equilibrium sorption isotherm model, a study was undertaken in which rain events were simulated and runoff from paving surfaces, which had been treated with herbicide spray, was analysed.

The concentration range experienced in storm events required a large dynamic range across which GC/MS was reliably able to detect the herbicides. Determination of the herbicides by gas chromatography/mass spectrometry was performed in runoff fractions collected from concrete and asphalt surfaces during simulated storm events. First-order decay models of the form $C = C_0 e^{-kt}$ were fitted to concentration-time plots of herbicide desorption from both concrete and asphalt, and runoff half-life determined for each herbicide.