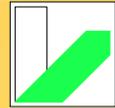


Pharmaceutical Transport in Agricultural Soils

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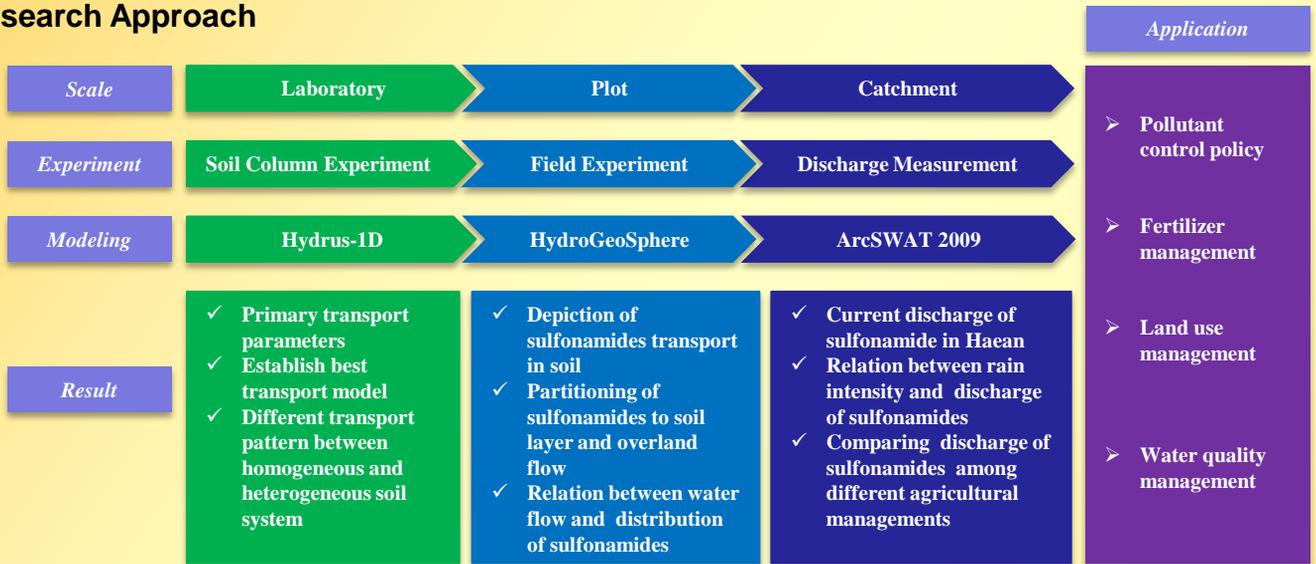
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Introduction

Environmental science faces the challenge that active drug residues in the environment must be understood in terms of transport and fate, as well as their effects on terrestrial and aquatic ecosystems. Sulfonamide antibiotics are widely used to control infectious diseases of animals, and occurrence of the antibiotics in the environment has been frequently reported. Sulfonamides are only one of many important antibiotics of marketed medicines, but knowledge of the cycling of these compounds in agricultural areas is minimal, and this is addressed in our work. The overall objective of the project is to clarify and to broaden our knowledge of the transport and fate of selected sulfonamide antibiotics (sulfamethoxazole, sulfadimethoxine and sulfamethazine) in agricultural regions of Korea.

Research Approach



Results

Laboratory: Column Experiment

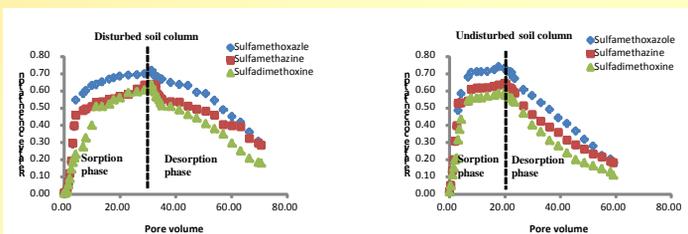


Fig. 1. Measured breakthrough curves in disturbed and undisturbed soil column

- ✓ Rapid flow in undisturbed soil column
- ✓ Matrix flow dominated in disturbed soil column
- ✓ Leaching of Sulfonamides was slower in disturbed soil system

Parameter optimization with Hydrus-1D



Plot: Field Experiment

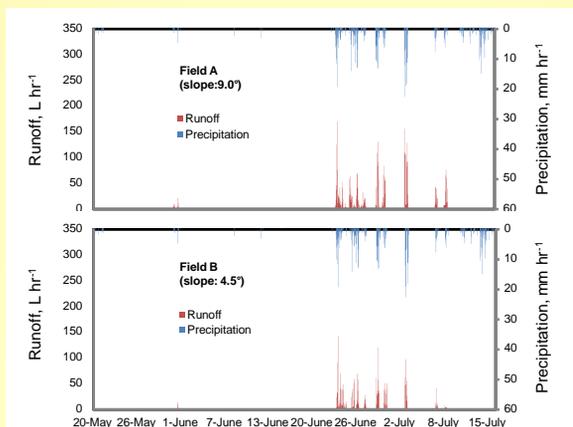


Fig. 2. Precipitation and runoff generation during experiment

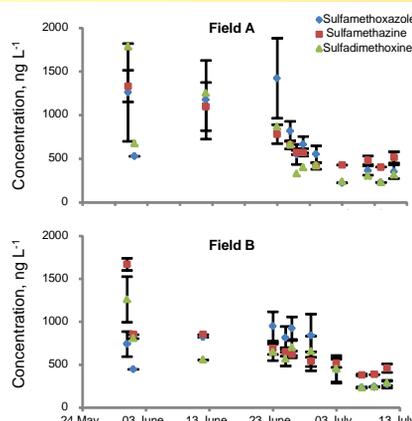


Fig. 3. Concentration of sulfonamide antibiotics in runoff

- ✓ As increasing accumulated precipitation, sulfonamides in runoff were decreased
- ✓ Slope affected runoff generation and distribution of target antibiotics in runoff

Parameter optimization with HydroGeoSphere

