Surface water sampling protocols

Two types of samples are collected for monitoring environmental levels of pesticide residue concentrations in the surface water of the watershed. Grab samples are collected monthly and polar organic chemical integrative samplers (POCIS) are deployed in Johnson Creek to estimate time-weighted average concentrations. Sampling sites are selected along Johnson Creek and an intermittent unnamed creek on the Eastern Nebraska Research and Extension Center (ENREC) to evaluate loading from land application of wastewater and wetcake, and from residual contamination due to accidental wastewater releases. Two of the monitoring sites on Johnson Creek are upstream from where wastewater releases from the AltEn plant may flow.

Sampling quality assurance procedures include use of standard sampling methods, completion of field sheets and chain of custody forms. Sample submittal forms are completed and provided with samples when delivered.

Grab samples are collected in precleaned and combusted 250-mL amber glass jars with Teflon lined lids, labeled with station ID, date and time, desired protocol. Sampling personnel use fresh nitrile gloves to ensure there is no cross contamination between locations. Each jar is opened, carefully dipped to capture flow at approximately 10 cm below the water surface. Jars are closed and stored on ice until delivery to the University of Nebraska Water Science Laboratory (WSL) in Lincoln Nebraska.

POCIS samplers are purchased from Environmental Sampling Technologies (St. Joseph, MO) and stored at -20º C until deployment. Each device is labelled and mounted on a stainless steel carrier and inserted into a perforated stainless steel canister. The canister is deployed at the same time as grab samples are collected and anchored to the stream bed using a chain and small steel post. After deployment for approximately 28 days, each POCIS sampler is removed, labeled, wrapped in aluminum foil, and stored on ice until delivery to WSL for analysis. POCIS are stored at -20o C until they are extracted using published methods.

Analysis of all samples for selected neonicotinoid insecticides, fungicides and their transformation products is carried out using liquid chromatography tandem mass spectrometry (LC-MS/MS) at the Water Sciences Laboratory. The WSL has an extensive quality assurance program that includes validation all analytical methods and detection limits using accepted EPA protocols, with frequent analysis of quality control samples, including method blanks, laboratory fortified blanks, laboratory duplicates, and laboratory fortified matrix samples each at a frequency of 5%. Regularly used analytical methods are documented in standard operating procedures (SOPs) available upon request.