K20 Extraction of Heroin From *Lucilla Sericata* Larvae by Pressurized Fluid Extraction

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The aim of this presentation is to outline a method for the rapid extraction of heroin and its metabolites from maggots using pressurized fluid extraction. It will focus on the preparation and extraction of samples and compare analysis times and efficiency with established extraction methods.

This presentation will impact the forensic science community by bringing attention to the potential use of pressurized fluid extraction for applications in entomotoxicology. A rapid and efficient extraction of heroin and its metabolites from a larval matrix is presented. This method could be extended to similar cartilage-like matrices such as finger and toenails.

The use of fly larvae as toxicological specimens was first reported in 1980 and has since been widely studied and utilized forensically as a means of diagnosing death by drug intoxication. Fly larvae (Diptera) are frequently found on decomposing bodies long after tissue samples (blood, urine, organs) commonly used for toxicological analysis are no longer available or suitable for analysis. Diptera, may feed on the tissue of a deceased individual who had taken drugs while alive, thereby ingesting any remaining drug as well as its metabolites. Drug accumulation within the maggot occurs as it develops and analysis can provide evidence for the presence of a drug in the cadaver.

Traditional methods for the extraction of substances from maggots, including manual homogenization and sonication, can be lengthy and time consuming. In this presentation, the use of pressurized fluid extraction for the detection of heroin and its metabolites in blow fly larvae, *Lucilla Sericata* (Diptera: Calliphoridae) is offered as a rapid and simple extraction method reducing overall analysis time. *Lucilla Sericata* were reared on pork liver spiked with varying concentrations of heroin and its metabolites. Concen- trations were chosen based on those commonly found in tissue from heroin overdose victims. A surrogate spike (codeine-d3) was added to track extraction efficiency. Larvae were reared at 21.2ºC with cyclical artificial lighting simulating 14h daylight and 10h darkness. Larvae were harvested at 5 days and sacrificed by freezing to -80ºC. Prior to extraction, frozen larvae were ground using a mortar and pestle in liquid nitrogen. Extraction was carried out using pressurized solvent extraction by modifying previously reported methods for the extraction of substances from tissue samples. The extraction was carried out at 100ºC and 1500 psi using methanol as the extraction solvent. The extract was evaporated to required volume with nitrogen.

Qualitative analysis was carried out via an established and previously validated method on a gas chromatograph coupled with a mass selective detector. The instrument was operated in split mode with a 1 ul injection. An internal standard (heroin d-6) was used for the analysis.

Entomotoxicology, Pressurized Fluid Extraction, Forensic Entomology

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