



B139 Determination of Capsaicin on Suspect's Garment Exposed to Aerosol Pepper Sprays

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The goal of this study is to determine the capsaicin from suspect's garment, exposed to aerosol pepper sprays in riot control and investigate the effects of time and environmental conditions on aerosol pepper spray residues on fabric samples for the confirmation of the suspect stains and contribution to justice in future forensic casework.

This presentation will impact the forensic community and/or humanity by focusing on the obtained data to determine whether it can be useful for the confirmation of invisible suspect stains and so contribute to justice in future forensic caseworks.

Background: Aerosol pepper sprays "Oleoresin Capsicum (OC)" are used as a self-defense and as a weapon in riot control. Oleoresin Capsicum became available as an aerosol spray and was initially used by FBI personnel in 1973. The residue of Oleoresin Capsicum may be found on a person's garment in forensic cases. Aerosol pepper spray causes an intense burning sensation, lacrimation, temporary blindness, erythema, restricted breathing, and disorientation. Aerosol pepper sprays are supplied in hand-held pressurized canisters, which include a diluted solution of the concentrated extracts of cayenne pepper plant. This study aimed to determine the capsaicin from the suspect's garment exposed to aerosol pepper sprays in riot control and investigate the effects of time and environmental conditions on aerosol pepper spray residues on fabric samples.

Experimental Method: Analysis of capsaicin was performed with GC/EI-MS (Gas Chromatography/Electron Impact-mass spectrometry using an HP (Hewlett-Packard) 6890 equipped with a 5973 mass selective detector. This method has been developed in the current study to evaluate the extraction and quantitative analysis of capsaicin from four different fabrics (cotton, synthetic, cotton-synthetic, wool) after homogenous pepper spray treatment. Fabrics were dried and stored at ambient room conditions. Every fabric was divided into seven equal parts on 0, 1, 2, 5, 10, 20, and 30th days. Three pieces (30x30 mm; approximately 66-250 mg) were cut each day. The fabrics were placed into 13x100 mm test tubes. As described in a previous research, the best recovery for capsaicin is provided with methanol extraction. Five milliliters of methanol were added to the test tube and sonicated for 10 minutes. The fabrics were removed from test tubes. The extracts were dried under a stream of nitrogen at room temperature. To each test tube, 100 µl of N,N-diphenylethylenediamine solution in methanol as internal standard and 100 µl of methanol were added.

Conclusions: In this study the capsaicin from victim's garment exposed to aerosol pepper spray in riot control or self-defense was determined and the effect of time to aerosol pepper spray on fabric samples was investigated. During the method development process, methanol provided good recovery (approximately 82%) for capsaicin on different fabrics. Limit of detection for capsaicin was 40 g/L. Calibration curves for the methanol extracts of capsaicin were linear from 40-500 g/L (ppm). Capsaicin may be investigated from the garment of a suspect due to its non-volatile character. This study showed that capsaicin amounts on fabrics in 30 days changed about 20% according to effects of time and ambient room conditions. After 3 months of storage in ambient room conditions, the concentration of capsaicin was reduced. The data obtained by this study can be useful for the confirmation of invisible suspect stains during at least three months and thus contribute to justice in future forensic casework. This method can be used simply for analysis of capsaicin from suspect's garments exposed to aerosol pepper sprays and it is suitable for application in forensic routine analysis.

Capsaicin, Riot Control, Marker