PROCEDURE FOR THE EXAMINATION
OF PEPPER SPRAY EVIDENCE

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These procedures have been reviewed and approved for use by the personnel of the Trace
Evidence Section of the State Bureau of Investigation Crime Laboratory. This action does not
signify this procedure to be mandated to the extent that it precludes the use of variations of this
procedure or different procedures for accomplishing the desired assay. Physical and personnel
resources, technological change, and examiner preference (within the bounds of good laboratory
technique and quality control) determine what examination procedures are appropriate and / or
acceptable for a given set of circumstances as encountered in the Trace Evidence Section.
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The following technical procedure will be followed for the examination of items of evidence
containing pepper spray. For the purpose of examination, samples will be divided into two
types. The first is canisters. The second is clothing or other objects which have been sprayed or
otherwise exposed to the pepper spray.

General Flow Diagram For Canisters:

Weigh Canister

Spray Contents into Glass Container

Instrumental Analysis of Liquid

Evaporate Solvents

FTIR

Extract

GC/MS

Weigh Empty Canister

Report

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General Flow Diagram for Clothing or Other Objects

I. Suggested applications
   A. To determine the functionality of a canister and quantity of product left in the canister.
   B. To determine if a stain located on clothing or other objects could be from pepper spray.

II. Procedures
    A. Analysis of canisters and their contents
       1. All vital information from each canister label is recorded.
       2. Each canister is weighed and the weight recorded.
       3. The canister is emptied into a clean glass container.
       4. The empty canister is weighed and the weight recorded.
       5. Instrumental analysis of the product.
          a. GC/MS analysis
1) Extract the capsaicin from the liquid.
2) Analyze using GC/MS
   b. FTIR analysis
      1) Place a sample of the liquid into a glass petri dish and place into a drying oven at a low temp (50-100C).
      2) Remaining oil can be analyzed by FTIR.

B. Analysis of suspected stains
1. Locate the stain and remove it from the substrate, either by mechanical means (i.e. scraping) or chemical means (soak in basic aqueous solution or in chloroform).
2. Analyze using GC/MS or FTIR following the protocols in the analysis of canisters and their contents.

III. Safety Concerns
A. Pepper sprays are strong lachrymators. Safety glasses and protective clothing (lab coat, gloves, goggles, etc) should be worn when working with this type of evidence.
B. All spraying is to be done in a fume hood.

IV. Possible Conclusions from the Analysis of Pepper Spray
A. All results and conclusions should be based on the chemist’s knowledge and experience. Results must be in agreement with the technical reviewer.
B. Conclusions
   1. Functionality of the canister actuator
      a. The actuator is in working condition.
      b. The actuator is not in working condition, therefore no analysis could be performed.
   2. Sufficiency of propellant to completely empty the canister
      a. There was sufficient propellant to empty the canister completely.
      b. The canister did not have sufficient propellant to empty all the contents.
   3. Quantity of pepper spray remaining in the canister
      a. The canister contained ____ grams/ounces of liquid.
      b. This amount was ____% of the amount stated on the label for a full canister.
   4. Pepper spray on objects/clothing
      a. The oily residue found on Item A was found to be chemically consistent with the oil component of the known pepper spray in Item B.
      b. The stain on Item A was found to contain capsaicin, the active ingredient in pepper spray.

V. Validation References for Pepper Spray Analysis
A. Kalsec, Inc., Technical Data: Oleoresin Capsicum, Water Soluble, Decolorized,
1993.


