A study of gunshot residue distribution for close-range shots with a silenced gun using optical and scanning electron microscopy, X-ray microanalysis and infrared spectroscopy

Zuzanna Brożek-Mucha

PII: S1355-0306(16)30127-7
DOI: doi: 10.1016/j.scijus.2016.11.004
Reference: SCIJUS 635

To appear in: *Science & Justice*

Received date: 19 July 2016
Revised date: 24 November 2016
Accepted date: 26 November 2016

Please cite this article as: Zuzanna Brożek-Mucha , A study of gunshot residue distribution for close-range shots with a silenced gun using optical and scanning electron microscopy, X-ray microanalysis and infrared spectroscopy. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Scijus(2016), doi: 10.1016/j.scijus.2016.11.004

A study of gunshot residue distribution for close-range shots with a silenced gun using optical and scanning electron microscopy, X-ray microanalysis and infrared spectroscopy

Zuzanna Brożek-Mucha
Institute of Forensic Research, Department of Criminalistics, Westerplatte St. 9, 31-033 Krakow, Poland
Tel. (48 12) 422 87 55
Fax (48 12) 422 38 50
E-mail: zbrozek@ies.krakow.pl

1. Introduction

Organic and inorganic components of gunshot residue (GSR) spread in the place and time of a gunshot [1-6]. Thus, collection of evidence materials from people and subjects related to a shooting incident and detection of GSR may contribute to establishing some circumstances of the incident and so, to the reconstruction of its course. Most often practitioners of the administration of justice ask forensic experts, whether a person was related to a shooting incident. This expertise has always been the most demanding one and concerned the identification of particles as characteristic or consistent with gunshot residue taking into account both the chemical content and spherical morphology. These can be simultaneously revealed by means of scanning electron microscopy coupled with energy dispersive X-ray spectrometry (SEM-EDX) [7-11].

In many cases however, a gunshot as a cause of a homicide or a serious injury makes no doubts and does not need to be proven. Moreover, a firearm with a load of ammunition is available for examinations, however, other types of questions are to be answered to explain and reconstruct the course of the incident, such as establishing the entrance and the exit wound in the body and clothing of the victim for establishing the direction as well as the