

FORENSIC LITERATURE THESIS

LITERATURE THESIS

Title	: <i>Detection and profiling of chemical warfare agents in dried blood spots</i>
Keywords	: CBRN, chemical profiling, sampling, dried blood spots
Forensic Expertise Area	: Forensic analytical chemistry
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SHORT DESCRIPTION

The continuing threats of military conflicts and terrorism may involve the misuse of chemical weapons. Despite the effort of the Organisation for the Prohibition of Chemical Weapons (OPCW), chemical weapons are regularly used, e.g. in the Syrian Arab Republic [1]. If there is an investigation of alleged use of these toxic chemicals, environmental and biomedical samples are taken. Subsequently, forensic investigations are performed to identify the chemical and to apply impurity profiling for intelligence purposes.

One of the remaining challenges in chemical impurity profiling concerns the stability of the actual sample during sampling, transportation, storage and analysis [2]. Especially in case of reactive chemicals such as chemical warfare agents (CWAs) it can be expected that a specific profile is highly prone towards change over time, in particular when some of the components remain in their reactive state. A possible way of 'freezing' the signature might be through drying plasma or whole blood on filter paper [3,4]. For instance, a sulfur mustard adduct in human serum albumin is a very stable biomarker in plasma samples even weeks after exposure [5]. This fixation will transform at least the reactive components in a more stable form and will also stop possible degradation of other components within the chemical profile.

The aim of this literature thesis is to explore whether dried blood spots can be used to maintain a stable attribution signature of chemical warfare agents. Subsequently, various sample preparation strategies can be investigated which are required for the analytical chemical analysis.



U.N. team investigating chemical weapons use in Syria collects ground samples in August [6]

REFERENCES

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REQUIRED/RECOMMENDED EXPERTISE

- Basic understanding in forensic analytical chemistry.