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## Forensic analysis of a Glastonbury amnesty bin: Evaluation of compact spectrometer techniques compared to NMR

Majdah Alotaibi, Ian S Blagbrough and Stephen M Husbands  
University of Bath, UK

Forensic analysis of amnesty bins provides reliable and quantitative data on identity and purity of drug substances. Identification of cutting agents and their ratios can help link directly to a manufacturer or trafficking network. ATR-FTIR equipped with the TICTAC drug identification database was evaluated in this study and compared to NMR to provide a rapid, precise test for identifying substances and their impurities in an amnesty bin. The Glastonbury music festival (2013) amnesty bin samples were obtained from the Drug Expert Action Team (DEAT), Avon and Somerset Constabulary, UK. ATR-FTIR spectroscopic analysis was performed on a Bruker FT-IR spectrometer (ALPHA Bruker Optics, Billerica, MA, USA). <sup>1</sup>H NMR data were collected on a Bruker 500 MHz NMR spectrometer and NMReady-60 PRO (Nanalysis Corp., Canada). ATR-IR was successfully used to identify a wide variety of illicit drug samples, e.g. ketamine (22), mephedrone (33), flephedrone (4), cocaine (13), heroin (10), MDMA (76), methylone (1), and popper (14). Both ATR-IR and NMR discriminated between mephedrone and flephedrone, but benzocaine as a cutting agent was not recognized by ATR-IR. The possible diversion of street ketamine samples from legal sources was investigated by detecting the low levels of preservatives, down to 5µg/mL, present in pharmaceutical formulations using <sup>1</sup>H NMR when ATR-IR could not detect such concentrations of these preservatives. Although ATR-IR provides a quick non-destructive method to identify illicit drugs in seized samples, NMR provides rapid and quantitative information on drugs, preservatives, cutting agents, and impurities.

### Biography

Majdah Alotaibi is an Assistant Lecturer at the University of Tabuk, Saudi Arabia and is in the final year of her PhD at University of Bath, UK. Her project is focused on "impurity profiling of illicit drugs" using different techniques, e.g. HPLC, NMR, EA-IRMS, LC-MS/MS, GC-MS and Polarography. She has 3 years experience in the quantitative analysis of illicit drugs.

mrma20@bath.ac.uk

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