



## **Rising to the Forensic Analytical Challenges Associated with the Global Increase in Seizures of Cathinone-derived "Legal Highs"**

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Substances touted as “legal highs” and known by names such as “ivory wave” or “NRG-1” mimic the effects of illegal drugs such as amphetamine, cocaine and ecstasy. Sold as “bath salts”, plant food or incense these so-called “designer drugs” can be dangerous but despite this health danger many have not yet been made illegal and are difficult to detect with current drug tests.

These “bath salts” can cause euphoria, paranoia, anxiety and hallucinations. They often contain mephedrone, a synthetic compound structurally related to methcathinone, which is found in Khat - a plant that, like mephedrone itself, is illegal to possess in many countries.

“Bath salts” are usually labelled as being “not for human consumption” and the name “bath salts” is used by those who sell these substances as a way of circumventing legislation when supplying them. Mephedrone (a synthetic cathinone) was legal (or at least not illegal) in the UK until April 2010 when it was classified as a Class B, Schedule 1 substance (UK Misuse of Drugs Act 1971). The current challenges to law enforcement agencies are:

- (1) Identification and quantification of new and emerging illicit substances.
- (2) Tracing or linking product to precursor (i.e. source identification).

Here, we present as a potential way of tracing the source of the raw materials, and consequently providing information as to who is making the “bath salts”, which is based on identification of products and/or adulterants/excipients by GCMS in combination with isotopic profiling of both precursor and product to determine characteristic shifts or linkages in isotopic composition between starting material used, synthetic processes employed and resultant drug produced.