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Precursor discrimination of designer drug Benzylpiperazine using 13C and 15N stable isotopes

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Designer drugs, such as benzylpiperazine, have gained popularity as mimics or substitutes to already scheduled illegal drugs. Conventional chemical profiling of illicit drugs has been performed for years to try and determine the synthetic route employed and possibly identify the precursor chemicals used in a drug's preparation. Isotope analysis of drug compositions has gained interest as a tool for discriminating between different precursor reagent sources or suppliers. The isotopic composition of synthetic illicit drugs is characteristic of the starting materials used and the synthetic processes employed. Benzylpiperazine is prepared easily from relatively cheap and readily available products via the alkylation of piperazine with benzyl chloride to form the N-substituted piperazine analogue. The study aims to use the isotopic fingerprint of in-house synthesized BZP products to distinguish between different batches and to identify drugs to a common source of manufacture or supply. This study involves synthesizing 18 batches of BZP, using precursor reagents sourced from 3 different suppliers (6 batches per company). For each batch, both the end product and recovered intermediate will be analyzed by isotope ratio-mass spectrometry (IR-MS) (for carbon and nitrogen isotopes) and the results compared to see if it is possible to identify the precursor source used.