

LITERATURE THESIS

Title: **Illicit-drug impurities as candidates for synthesis route-specific markers**
Keywords: illicit drugs, impurity profiling, route-specific markers, GC-MS, synthesis routes
Forensic Expertise Area: Forensic Chemistry – Illicit Drugs
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SHORT DESCRIPTION

Synthetic drugs-of-abuse manufacturing, trafficking and use is a severe problem, both locally and worldwide. The Netherlands has become a major player in the worldwide synthetic drug production and distribution with an estimated annual trade value of 18,9 billion Euro. Dutch criminals are global leaders in the synthetic drugs industry. Consequently, synthetic drug use in the Netherlands is increasing and synthetic drugs are being considered as a more or less common phenomenon in the mainstream party and festival scene. Most abundant synthetic drugs are MDMA and amphetamine. With legislation put in place to control pre-cursors, clandestine drug manufacturers became more creative in synthesis routes using various pre-precursors that are more easy to obtain or to transport.¹

Impurities in the end-product can provide valuable tactical forensic information for batch origin and comparison. When these impurities are specific for a certain synthesis-route, they could also be used as a marker for the precursor used in the production process.²⁻⁴ In this way, retrospective analysis of already present GC-MS data from forensic laboratories can give valuable insights about the popularity of certain synthesis routes over time.^{5,6}

Goal of this literature thesis is to create an overview of the most important and recent synthesis routes for the most common synthetic drugs with their associated impurities. Important parameters to assess are those describing their usability for a retrospective data-mining approach on GC-MS data, such as yield/concentration in end-product, selectivity for a certain synthesis route and detectability in a general GC-MS screening. Other useful information includes molecular mass and GC-MS mass spectrum.

REFERENCES

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REQUIRED / RECOMMENDED EXPERTISE

Basic understanding in forensic chemistry. Affinity with illicit drugs synthesis and analysis is recommended.

