RTI Prominent Publications Summary

Analysis of Synthetic Cannabinoids Using High-Resolution Mass Spectrometry and Mass Defect Filtering: Implications for Nontargeted Screening of Designer Drugs

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Designer drugs are chemical analogs of illegal abused substances, usually devised to circumvent drug laws. In the late 2000s, one family of designer drugs, synthetic cannabinoids, became popular for recreational use because they produced effects similar to herbal cannabis but could not be detected by routine screening methods. Several countries banned the most popular examples, but manufacturers continued to flood the market with new, structurally related compounds.

Most traditional methods for drug detection are targeted, meaning that they are specific for a single compound, so new structures evade detection. Clandestine manufacturers can rapidly substitute closely related analogs for banned substances, creating a moving target and making detection challenging. This paper demonstrates that unbiased high-resolution mass spectrometry data acquisition, in conjunction with advanced accurate mass data interrogation techniques, can effectively screen for and identify new designer drugs. The approach is suitable for creating a nontargeted screening method for as-yet unknown structures.

Chemical & Engineering News (*C&EN*) and Internet sites highlighted the analytical approaches that RTI scientists described in this paper as “Mass Spectrometry Tracks Down Designer Drugs.” The paper also generated substantial discussion in the realm of law enforcement and customs, and the European Commission asked the authors to participate in a special customs workshop focusing on detection of designer drugs and slowing distribution across borders.

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