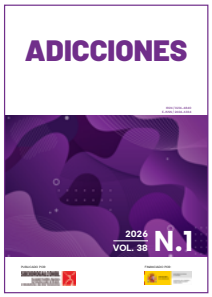
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LETTER TO THE EDITOR

False positives in amphetamine drug screening due to dimethyltryptamine

Falso positivo en el cribado de anfetaminas secundario a dimetiltriptamina

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Classic psychedelic compounds such as psilocybin, D-lysergic acid (LSD), N,N-dimethyltryptamine (DMT) and mescaline, among others, are frequently used worldwide today (Wilkes et al., 2024), and the use of ayahuasca has also expanded everywhere. Despite evidence supporting its therapeutic potential, more scientific proof is needed to fully assess therapeutic benefits (Ruffell et al., 2023). Also, ayahuasca can be used by alleged shamans to commit acts of sexual violence (Strano Rossi et al., 2019).

We present the case of a 45-year-old female patient admitted to the emergency department after suffering physical assault during a spiritual ceremony in a rural setting, from which she managed to escape. The patient admitted consuming ayahuasca, but did not report sexual assault or head trauma. Physical examination: blood pressure: 106/75 mmHg, heart rate: 104 bpm, temperature: 36ºC, SpO2: 100%. Good general condition, afebrile and hemodynamically stable. Nervous. Glasgow Coma Scale score of 15, no focal neurological deficits, no meningismus. Multiple abrasions on the upper and lower extremities. X-rays of both knees and knee bones showed no signs of fractures.

The urine toxicology screen was positive for cannabis (SureStep™ Urine Drug Test Cassette), and the toxicology protocol for chemical submission was requested from the referral hospital laboratory. The patient was discharged with a treatment of amoxicillin-clavulanic acid and ibuprofen.

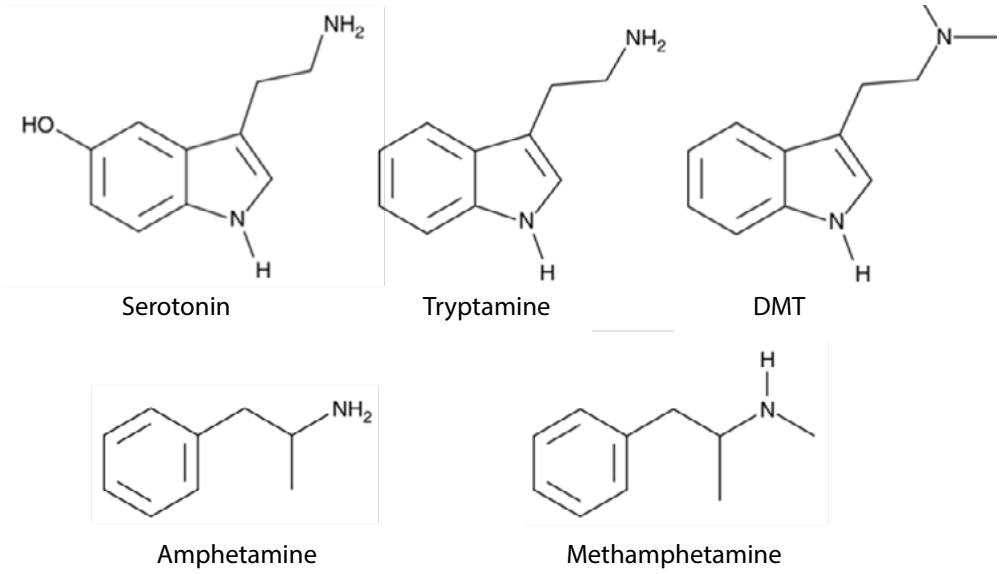
The referral hospital's urine toxicology screen was positive for amphetamines (>2000 ng/mL) and cannabis, and negative for ethyl glucuronide, cocaine, ecstasy, opiates, LSD, ketamine, methadone, and benzodiazepines (DRI® Assay, Microgenics Corporation). Blood alcohol concentration was undetectable. The presence of amphetamine, methamphetamine, or any substance known to produce false positives in the amphetamine immunoassay could not be confirmed by GC-MS. Scopolamine and GHB were also not detected. Using LC-MS/MS with a method capable of detecting 108 substances (MassTox® Drugs of

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Figure 1

Chemical structures: Serotonin, Tryptamine, N,N-Dimethyltryptamine (DMT), Amphetamine and Methamphetamine



Abuse, Chromsystems), only cannabis was detected (THC-COOH 45 ng/mL). Given the patient's reported history of voluntary intake, DMT and metabolites of β-carboline alkaloids were specifically sought in the non-targeted GC-MS analysis. DMT and hamol, the main metabolite of harmine, were identified using the National Institute of Standards and Technology Mass Spectral Library (NIST23).

Ayahuasca is a traditional Amazonian brew prepared by mixing two plants: *Banisteriopsis caapi vine* (containing β-carbolines) and *Psychotria viridis* (containing DMT). DMT is a tryptamine, a hallucinogenic compound structurally analogous to serotonin (Figure 1). It does not produce oral psychotropic effects on its own due to hepatic metabolism. However, the β-carbolines present in ayahuasca inhibit monoamine oxidases, allowing DMT to reach the central nervous system (Hamill et al., 2019). Ayahuasca causes cognitive, sensory, and emotional changes, including possible hallucinations and erratic behaviour, and patients may develop long-term cognitive impairment (dos Santos et al., 2017). The onset of these effects occurs 30-60 minutes after ingestion and lasts up to 4 hours. Common adverse effects include nausea and vomiting, tachycardia, agitation, hypertension, mydriasis, seizures, and neuroendocrine disturbances.

From a therapeutic perspective, family, social, and psychiatric history should be considered, toxicological screening should be ordered, symptomatic supportive care should be provided, and patients should be closely monitored. Benzodiazepines are indicated to control anxiety or agitation, and neuroleptics may also be necessary. Withdrawal syndromes are rare.

The lack of a specific immunoassay for DMT detection, and its very short half-life t1/2, makes DMT a difficult toxicological target in urine. Fatal cases with analytical confirmation of DMT are very rarely published. Sklerov et al. (2005) presented the case of a 25-year-old man found dead the morning after consuming herbal extracts containing hallucinogenic β-carbolines and tryptamines (Sklerov et al., 2005). In our setting, it has been detected and documented in two male patients in ED, also under application of a chemical submission protocol (Fernández Alonso et al., 2024). While LSD screening methods do not show cross-reactivity with DMT, false-positives have been documented in amphetamine screenings due to the structural similarity of DMT to amphetamine (Regester et al., 2015) (Figure 1). There are specific analytical methods allowing these alkaloids (DMT and β-carbolines) to be identified in conventional and alternative biological samples (Brito-da-Costa et al., 2020; Tavares et al., 2020).

In summary, DMT screening is recommended in drug-facilitated sexual assault protocols when victims are suspected of participating in spiritual rituals or when patients report experiencing brief but intense visual and auditory hallucinations. The potential for false positives in amphetamine screening caused by DMT should raise suspicion of its presence, although not all screening methods are affected in the same way.

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Conflict of interests

The authors declare no conflict of interest.

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