



## In The Media

### DMT: More Than Just Your Grandmother's Ayahuasca Brew

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In this edition of In The Media, we note the US Customs and Border Patrol's 2023 press announcement about the interception of 61 pounds of the psychedelic N,N-dimethyltryptamine (DMT) in Texas. (1) Psychedelic drugs have been garnering more attention due to their dual role as both drugs of abuse and potential therapeutic or "spiritual" agents.

DMT is a psychedelic that can cause a brief and intense euphoric or psychotic state. The psychosis is characterized by paranoia, delusions, hallucinations, and mood disturbances which can lead to aggression, self-harm, and self-neglect. (2) It can occur in users without any prior psychiatric history. (2)

DMT's origins trace back to *ayahuasca* ("the vine of the souls" in the Quechua language) rituals done in the Amazon region of South America. (2-6) Ayahuasca is a psychoactive brew made from boiling two plants, *Banisteriopsis caapi* containing  $\beta$ -carboline type alkaloids, which act as monoamine oxidase inhibitors to prevent the natural breakdown of DMT in the gut, and leaves from *Psychotria viridis*, which provide the alkaloid DMT. (3, 4) Ayahuasca has been used by indigenous shamans for over 3000 years as part of rituals across many South American countries for cultural, spiritual and religious purposes. (2, 5, 6)

DMT entered Western chemistry in 1931 when Canadian chemist Richard Manske synthesized the substance. (7) Its hallucinogenic properties were not discovered until

Hungarian chemist and psychiatrist Stephen Szára extracted DMT from the plant *Mimosa hostilis* and administered it to himself intramuscularly in 1956. (7) DMT is classified on Schedule I in the US. (7-9) The Religious Freedom Restoration Act of 2006 allows for the religious use of ayahuasca. (8) In Canada, DMT is classified as Schedule III under the Controlled Drugs and Substances Act, but is legal for certain religious groups to use. (10)

Despite DMT usage being lower than that of other hallucinogens (lifetime prevalence of 9% for DMT, vs 39% for LSD and 43% for psilocybin among users of hallucinogens, according to one study), DMT has the largest proportion of new users. (2) Interest in recreational use has been growing due to its rapid onset of action and the low levels of reported negative psychological effects with more traditional ayahuasca preparations. (2, 11) With that being said, more direct and intense abuse of DMT is also occurring. Recreational DMT abuse mainly presents with hallucinations, depersonalization, tachycardia, and agitation, with the median age of users being 21. (2) Users report a feeling of euphoria and vivid visual hallucinations, as well as altered sense of time and body image and perceived greater capacity for introspection. More severe physiological effects include hypertension, seizures, nystagmus, ataxia, coma, and respiratory arrest. (9)

DMT acts on the brain's 5-HT<sub>2A</sub> serotonin receptors to produce a euphoric, intense, and brief dream-like state. (2, 6) DMT administered via IV, IM, inhalation, insufflation, transdermal, sublingual or buccal routes is quickly metabolized by the kidneys and cleared. (12) Smoked, vaporized, or insufflated DMT produces strong effects lasting less than 30 minutes. IV administration yields peak DMT blood levels within 2 minutes and becomes negligible after 30 minutes. The effects of IM administration were less intense than the IV route. When given IM, the effects of DMT generally have a rapid onset (2-5 minutes) and last 30-60 minutes. (12)

Due to its short half-life, psychotic reactions rarely last longer than 48 hours, with rates estimated at 0.8/1000. (13) It is difficult to screen and test for due to its rapid metabolism. DMT can only be detected for a few hours in blood or saliva, 24 hours in the urine, and up to 90 days in the hair follicle. (14) Overdoses are uncommon due to the short

half-life, but can cause severe symptoms such as seizures, cardiac arrest, respiratory arrest, loss of consciousness, and death. (15)

Treatment is mainly supportive. In regards to studies involving ayahuasca, transient dysphoric reactions presenting as anxiety and psychotic-like features (altered perception and thought content) may occur, with verbal support reducing distress. (13) If psychotic symptoms are severe and persistent, antipsychotics may be administered in a medical setting.

DMT is known in the streets by such names as Dimitri; Businessman's Trip; Fantasia; Changa; 45-Minute Psychosis; and Rogan. (16) It was called the "Spirit Molecule" by Rick Strassman, who wrote a book and produced a documentary about DMT. (17)

Interesting research is emerging regarding the possible utility of DMT as a therapeutic agent. (3, 4, 12) It has been shown to reduce ischemic brain injury through anti-apoptotic, pro-neurotrophic and anti-inflammatory effects by binding to the sigma-1 receptor in neurons and microglia in rat models. (3) Sigma-1 receptors are signaling molecules implicated in synaptic plasticity which enhance the function of NMDA receptors. Sigma-1 receptor agonists are thought to be potentially neuroprotective and have been shown to reduce inflammation and induce neuronal plasticity by activating transcription factors. (12)

In terms of psychotherapy, several placebo-controlled trials have been published regarding efficacy of psychedelic-assisted therapy in treating post-traumatic stress disorder, anxiety/depression associated with a life-threatening illness, unipolar depression, addiction, and social anxiety among autistic adults. (4, 12) However, much research still needs to be done in regards to dosing, safety, and efficacy of this psychedelic compound.

Overall, DMT is an interesting compound given its growing recreational use, as well as potential legitimate neurological and psychopharmacological use. It is a short-acting drug that can cause psychotic episodes when abused. The altered states of users can lead to forensic involvement, and it is difficult to detect with standard pharmacological screens. Usage may need to be specifically asked about, considering that its popularity is

relatively recent. As seen from the Border Patrol press release, DMT is being trafficked. In the future, it is likely to show up in more locations and in more potent forms than those traditionally encountered in ayahuasca ritual brews.

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