

Statement of Torsten Passie M.D., Ph.D

I have not received any monetary compensation from any parties involved in this court case.

I am a state-financed psychiatric expert and researcher employed at Hannover Medical School (Europe, Germany). I have worked for more than 20 years in the field of psychiatric addiction research. My Curriculum vitae is attached.

I have led and completed clinical (human subject) studies of the drugs cannabis, ketamine, nitrous oxide, and psilocybin.

A dissertation under my guidance was recently completed, reviewing all the psychopharmacological data about the major hallucinogenic tryptamines (including DMT, 5-MeO-DMT, DET, DPT, and others).

Our research group has published comprehensive pharmacological reviews of psilocybin¹ and LSD².

Here are some of my points regarding the use of Ayahuasca in an established setting of a specific religious group, which includes the plaintiff in this case.

Pharmacological considerations

1.1 DMT has a well-documented pharmacology based on many experimental human and animal studies (in contrast to other hallucinogenic tryptamines)³.

1.2 DMT is part of the human physiology⁴. Its functions are still unknown⁵.

1.3 DMT is physiologically well tolerable in healthy humans⁶. There are no deaths documented from DMT use⁷.

1.4 DMT causes no long-lasting alterations of the brain or organism⁸.

1.5 It was repeatedly demonstrated that DMT (and its metabolites) is not involved in the pathophysiology of psychoses⁹.

1.6 Physiological DMT may play a role in the physiology of dreaming¹⁰.

1.5 DMTs receptor pharmacology is different from LSD¹¹.

1.6 There is only partial cross-tolerance between DMT and LSD¹².

1.7 DMT has almost no effects on the brain's dopamine mediated reward system, which would predict that DMT's capacity for addiction is extremely limited¹³.

1.8 DMT does not induce addictive behavior in monkeys and other mammals (in contrast to for example the dependence-producing opiates or stimulants, animals do not inject themselves with DMT when available)¹⁴.

Pharmacokinetics and harm reduction

2.1 Ayahuasca preparations may be referred to as a harm-reduced hallucinogen for the following reasons:

a) DMT is very short-acting (smoked 5-15 min.; intramuscular 30-50 min., as Ayahuasca-oral preparation 30-80 Min.) compared to LSD (6-10 hrs.)¹⁵.

b) When DMT is given as an orally active drink, the experience is much more compatible to human subjects. The applied dose and its pharmacokinetics are much more controllable, in contrast to all other routes (except for intramuscular)¹⁶.

c) The curve of DMT's subjective effects after oral dose administration is much less like a peak and is a 45 min. plateau instead¹⁷.

d) Because of the slow onset by the oral route, humans can adjust much better to the physiological and psychological changes induced¹⁸.

e) Controlled oral ingestion reduces DMTs potential for psychological harm (no overwhelming effects as known from smoking or injecting DMT)¹⁹.

f) Controlled oral ingestion reduces DMTs potential for physiological changes (no steep blood pressure rise as known from smoking or injecting DMT)²⁰.

g) The harmala alkaloids in the Ayahuasca preparation add a sedating component and for this reason attenuates the arousal effects induced by DMT²¹.

2.2 There may be drug or dietary interferences with the Harmala-alkaloids used in the Ayahuasca potion. These have to be evaluated separately from DMTs effects.

Potential health hazards resulting from DMT/Ayahuasca use

3.1 There are no emergency room visits documented in regard to DMT or Ayahuasca.

3.2 There are no prolonged psychotic reactions, drug-induced psychosis, suicides or criminal acts resulting from DMT use documented in the scientific literature.

3.3. There are no flashbacks or HPPD resulting from DMT documented in the scientific literature.

3.4 Health hazards from DMT/Ayahuasca may result from weakening of ego structures in predisposed psychologically labile (or prepsychotic) subjects, which have to be screened out²².

3.5 There is no evidence that these religious groups attract specifically mentally ill people²³.

Social considerations

4.1 The drug DMT is known to researchers since ca. 1955 and to the drug scene since ca. 1965²⁴, but DMT was never widely distributed in human research or the drug scene²⁵ (approx. < 0,001% of drug taking and criminality).

4.2 The three major Brazilian ayahuasca religions do not appear to have significantly expanded their membership since the mid-90s²⁶.

4.3 No critical expansion or dangers have resulted since the Netherlands' Santo Daime groups were given official recognition and exemption from criminal penalty for their sacramental ingestion of ayahuasca/Daime²⁷.

Critical points

5.1 Critical is the initial screening of participants before they begin to participate. Ideally, a screening instrument would capture detailed mental health history and be administered or reviewed with a professional psychiatrist.

5.2 Participating subjects have to be screened for other medical conditions and for other (potentially interacting) medications²⁸.

5.2 A system of quality control for sacramental ayahuasca should be established.

5.3 As far as known from European countries (Spain and the Netherlands) there seems to be no public health risks resulting from UDV/Santo Daime religious rituals. Nor have specific health problems been documented to arise from the religious use of ayahuasca, but such risks have not been ruled out completely.

FOOTNOTES

1. Passie, T., J. Seifert, U. Schneider and H. M. Emrich. The pharmacology of Psilocybin. Addict Biol 7 (2002): 357-364.
 2. Passie, T., Halpern, J. H., Stichtenoth, D. O., Emrich, H. M., Hintzen, A. The pharmacology of lysergic acid diethylamide: a review. CNS Neuroscience and therapeutics 14 (2008): 295-314.
 3. Pharmakologie halluzinogener Tryptamine.
- Shulgin, A. and A. Shulgin. Tihkal - The Continuation. Berkeley: Transform Press, 1997 .
4. Axelrod, J. Enzymatic formation of psychotomimetic metabolites from normally occurring compounds. Science 134 (1961): 343-344. Saavedra, J. M. and J. Axelrod. Psychotomimetic N-methylated tryptamines: formation in brain in vivo and in vitro. Science 175 (1972): 1365-1366.
 5. See for example Luchins, D., T. A. Ban and H. E. Lehmann. A review of nicotinic acid, N-methylated indoleamines and schizophrenia. Int Pharmacopsychiatry 13 (1978): 16-33.
Callaway, J. C. DMT's in the human brain. Yearbook of Ethnomedicine (1995): 45-54.
Jacob, M. S. and D. E. Presti. Endogenous psychoactive tryptamines reconsidered: an anxiolytic role for dimethyltryptamine. Medical Hypotheses 64 (2005): 930-937.
 6. Relevant clinical studies are: Gouzoulis-Mayfrank, E., K. Heekeren, A. Neukrich, M. Stoll, C. Stock, M. Obradovic and K. A. Kovar Psychological effects of (S)-ketamine and N,N-dimethyltryptamine (DMT): a double-blind, cross-over study in healthy volunteers. Pharmacopsychiatry 38 (2005): 301-311.
Arnold, O. H. and G. Hoffmann. Zur Psychopathologie des Dimethyl-Tryptamin. Wiener Zeitschrift f. Nervenheilkunde 13 (1957): 438-445.
Bickel, P., A. Dittrich and J. Schoepf. Eine experimentelle Untersuchung zur bewusstseinsverändernden Wirkung von N,N-Dimethyltryptamin (DMT). Pharmakopsychiatr Neuropsychopharmakol 9 (1976): 220-225.
Strassman, R. J. and C. R. Qualls. Dose-response study of N,N-dimethyltryptamine in humans. I. Neuroendocrine, autonomic, and cardiovascular effects. Arch Gen Psychiatry 51 (1994): 85-97.
Szara, S., L. H. Rockland, D. Rosenthal and J. H. Handlon. Psychological effects and metabolism of N,N-diethyltryptamine in man. Arch Gen Psychiatry 15 (1966): 320-9.
 7. See Laing, R. Hallucinogens: A Forensic Drug Handbook. Amsterdam, Boston, London et al.: Academic Press, 2003. Torres, C. M. Status of Research on Psychoactive Snuff Powders. In: Räsch, C., J. R. Baker (Hrsg.) Yearbook of Ethnomedicine 5 (1996), pp. 15-39.
 8. Rendon, O. R. The effect of psychotomimetic drugs upon human chromosomes in tissue culture. Cellule 70 (1974): 331, 333-358.
Strassman, R. J. Human psychopharmacology of N,N-dimethyltryptamine. Behav Brain Res 73 (1996): 121-4.
Riba, J. Human Pharmacology of Ayahuasca. Ph.D.-Dissertation: Universitat Autònoma de Barcelona, Barcelona, 2003.
 9. Lipinski, J. F., L. R. Mandel, H. S. Ahn, W. J. Vanden Heuvel and R. W. Walker. Blood dimethyltryptamine concentrations in psychotic disorders. Biol Psychiatry 9 (1974): 89-91. Gillin, J. C. and R. J. Wyatt. Evidence for and against the involvement of N,N-dimethyl-tryptamine (DMT) and 5-methoxy-N,N-dimethyltryptamine (5-MeO-DMT) in schizophrenia. Psychopharmacol Bull 12 (1976): 12-13.
Uebelhack, R., L. Franke and K. Seidel. Methylierte und nichtmethylierte Indolamine im zisternalen Liquor bei akuten endogenen Psychosen. Biomed Biochim Acta 42 (1983): 1343-1346.
Wyatt, R. J., J. C. Gillin, J. Kaplan, R. Stillman, L. Mandel, H. S. Ahn, W. J. VandenHeuvel and R. W. Walker. N,N-dimethyltryptamine - a possible relationship to schizophrenia? Adv Biochem Psychopharmacol 11 (1974): 299-313.
 10. Callaway, J. C. A Proposed Mechanism for the Visions of Dream Sleep. Medical Hypotheses 26 (1998): 119-124.
 11. Smith, R. L., H. Canton, R. J. Barrett and E. Sanders-Bush. Agonist properties of N,N-dimethyltryptamine at serotonin 5-HT_{2A} and 5-HT_{2C} receptors. Pharmacol Biochem Behav 61 (1998): 323-330.

Quock, R. M., M. H. Lum and S. F. Small. Interaction of N,N-dimethyltryptamine with central neuroaminergic receptor blocking agents. Proc West Pharmacol Soc 22 (1979): 217-218.

Yanai, K., T. Ido, K. Ishiwata, J. Hatazawa, T. Takahashi, R. Iwata and T. Matsuzawa. In vivo kinetics and displacement study of a carbon-11-labeled hallucinogen, N,N-[11C]dimethyltryptamine. Eur J Nucl Med 12 (1986): 141-146.

For review see: Nichols, D. E. Hallucinogens. Pharmacol Ther 101 (2004): 131-181. Passie, T., Halpern, J. H., Stichtenoth, D. O., Emrich, H. M., Hintzen, A. The pharmacology of lysergic acid diethylamide: a review. CNS Neuroscience and therapeutics 14 (2008): 295-314.

12. Passie, T., Halpern, J. H., Stichtenoth, D. O., Emrich, H. M., Hintzen, A. The pharmacology of lysergic acid diethylamide: a review. CNS Neuroscience and therapeutics 14 (2008): 295-314.

Rosenberg, D. E., H. Isbell, E. J. Miner and C. R. Logan. The effects of N,N-dimethyltryptamine in human subjects tolerant to lysergic acid diethylamide. Psychopharmacologia 5 (1964): 217-227.

13. Waldmeier, P. C. and L. Maitre. Neurochemical investigations of the interaction of N,N-dimethyltryptamine with dopaminergic system in rat brain. Psychopharmacology (Berl) 52 (1977): 137-144.

Haubrich, D. R. and P. F. Wang. N,N-dimethyltryptamine lowers rat brain acetylcholine and dopamine. Brain Res 131 (1977): 158-161.

Hetey, L., R. Schwitzkowsky and W. Oelssner. Influence of psychotomimetics and lisuride on synaptosomal dopamine release in the nucleus accumbens of rats. Eur J Pharmacol 93 (1983): 213-220. 9.

Gessner, P. K. Stoff, D. M., D. A. Gorelick, T. Bozewicz, W. H. Bridger, J. C. Gillin and R. J. Wyatt. The indole hallucinogens, N,N-dimethyltryptamine (DMT) and 5-methoxy-N,N-dimethyltryptamine (5-MeO-DMT), have different effects from mescaline on rat shuttlebox avoidance. Neuropharmacology 17 (1978): 1035-1040.

14. Siegel, R. K. and M. E. Jarvik DMT self-administration by monkeys in isolation. Bulletin of the Psychonomic Society 16 (1980): 117-120.

15. Szara, S. The comparison of the psychotic effect of tryptamine derivatives with the effects of mescaline and LSD-25 in self-experiments. Psychotropic Drugs (1957): 460-467. Passie, T., Halpern, J. H., Stichtenoth, D. O., Emrich, H. M., Hintzen, A. The pharmacology of lysergic acid diethylamide: a review. CNS Neuroscience and therapeutics 14 (2008): 295-314.

16. Riba, J., M. Valle, G. Urbano, M. Yritia, A. Morte and M.J. Barbanoj. Human Pharmacology of Ayahuasca: Subjective and Cardiovascular Effects, Monoamine Metabolite Excretion, and Pharmacokinetics. J Pharmacol Exp Ther 306 (2003): 73-83. 6. Strassman, R. J. Human psychopharmacology of N,N-dimethyltryptamine. Behav Brain Res 73 (1996): 121-4.

17. Riba, J. Human Pharmacology of Ayahuasca. Ph.D.-Dissertation: Universitat Autònoma de Barcelona, Barcelona, 2003. Callaway, J. C., D. J. McKenna, C. S. Grob, G. S. Brito, L. P. Raymon, R. E. Poland, E. N. Andrade, E. O. Andrade and D. C. Mash. Pharmacokinetics of Hoasca alkaloids in healthy humans. J Ethnopharmacol 65 (1999): 243-256. Yritia, M., J. Riba, J. Ortuno, A. Ramirez, A. Castello, Y. Al faro, R. de la Torre and M. J. Barbanoj. Determination of N,N-dimethyltryptamine and β -carboline alkaloids in human plasma following oral administration of Ayahuasca. Journal of Chromatography B 779 (2002): 271-281.

Gouzoulis-Mayfrank, E., K. Heekeren, A. Neukrich, M. Stoll, C. Stock, M. Obradovic and K. A. Kovar. Psychological effects of (S)-ketamine and N,N-dimethyltryptamine (DMT): a double-blind, cross-over study in healthy volunteers. Pharmacopsychiatry 38 (2005): 301-311.

Strassman, R. J. and C. R. Qualls. Dose-response study of N,N-dimethyltryptamine in humans. I. Neuroendocrine, autonomic, and cardiovascular effects. Arch Gen Psychiatry 51 (1994): 85-97.

Diagram of the typical clinical course of DMT-effects (equivalent to plasma levels) during different modes of application (nach Angaben von Strassman et al. 1994a, Callway et al. 1999, Riba 2003, Gouzoulis-Mayfrank et al. 2005). ("Geraucht" = inhaled, "geschnupft" = sorted).

18. Riba, J., A. Rodriguez-Fornells, G. Urbano, A. Morte, R. Antonijoan, M. Montero, J. C. Callaway and M. J. Barbanoj. Subjective effects and tolerability of the South American psychoactive beverage Ayahuasca in healthy volunteers. Psychopharmacology (Berl) 154 (b): 85-95.

Szara, S. DMT (N,N-Dimethyltryptamine) and Homologues: Clinical and Pharmacological Considerations. In: Efron, D. H. (ed.) Psychotomimetic Drugs New York: Raven Press, 1970, pp. 275-298.

19. Riba, J. Human Pharmacology of Ayahuasca. Ph.D.-Dissertation: Universitat Autònoma de Barcelona, Barcelona, 2003.
Riba, J., M. Valle, G. Urbano, M. Yritia, A. Morte and M.J. Barbanj. Human Pharmacology of Ayahuasca: Subjective and Cardiovascular Effects, Monoamine Metabolite Excretion, and Pharmacokinetics. J Pharmacol Exp Ther 306 (2003): 73-83.
Szara, S. Metabolic and physiological correlates of the psychological reaction to three short-acting tryptamine derivatives. Neuropsychopharmacology (1967c): 1115.
20. Strassman, R. J. Human psychopharmacology of N,N-dimethyltryptamine. Behav Brain Res 73 (1996): 121-4.
Riba, J., M. Valle, G. Urbano, M. Yritia, A. Morte and M.J. Barbanj. Human Pharmacology of Ayahuasca: Subjective and Cardiovascular Effects, Monoamine Metabolite Excretion, and Pharmacokinetics. J Pharmacol Exp Ther 306 (2003): 73-83.
Callaway, J. C., L. P. Raymon, W. L. Hearn, D. J. McKenna, C. S. Grob, G. S. Brito and D. C. Mash. Quantitation of N,N-dimethyltryptamine and harmala alkaloids in human plasma after oral dosing with ayahuasca. J Anal Toxicol 20 (1996): 492-497.
Szara, S. Metabolic and physiological correlates of the psychological reaction to three short-acting tryptamine derivatives. Neuropsychopharmacology (1967): 1115.
21. See Callaway, J. C., L. P. Raymon, W. L. Hearn, D. J. McKenna, C. S. Grob, G. S. Brito and D. C. Mash. Quantitation of N,N-dimethyltryptamine and harmala alkaloids in human plasma after oral dosing with ayahuasca. J Anal Toxicol 20 (1996): 492-497.
Glennon RA, Dukat M, Grella B, Hong S, Costantino L, Teitler M, Smith C, Egan C, Davis K, Mattson MV. Binding of beta-carbolines and related agents at serotonin (5-HT₂) and 5-HT_{1A}), dopamine (D₂) and benzodiazepine receptors. Drug Alcohol Depend 60(2) (2000):121-32.
22. Leuner, H. Halluzinogene. München-Stuttgart-Wien: Hans Huber, 1981.
23. Cf. Barbosa, P. C. R., J. S. Giglio and P. Dalgarrondo Altered states of consciousness and short-term psychocological after-effects induced by the first time ritual use of ayahuasca in an urban context in brazil. Journal of psychoactive drugs 37 (2005): 193-201.
Santos, R. G., J. Landeira-Fernandez, R. J. Strassman, V. Motta and A. P. Cruz. Effects of ayahuasca on psychometric measures of anxiety, panic-like and hopelessness in Santo Daime members. J Ethnopharmacol 112 (2007): 507-513.
Halpern, J. H., A. R. Sherwood, T. Passie, K. C. Blackwell and A. J. Ruttenber Evidence of health and safety in American members of a religion who use a hallucinogenic sacrament. Med Sci Monit 14 (2008): 15-22.
24. Leary, T. Programmed Communication during Experiences with DMT (Dimethyltryptamine). Psychedelic Review (1966): 83-95.
25. Stafford, P. DMT, DET, DPT and Other Short-Acting Tryptamines. In: Stafford, P. Psychedelics Encyclopedia. Berkeley, CA: Ronin Publishing, 1992, pp. 309-331.
Stafford, P. Heavenly Highs. Ayahuasca, Kava-Kava, DMT & Other Plants of the Gods. Berkeley, CA: Ronin Publishing, 2005.
26. Balzer, C. Ayahuasca rituals in Germany: The first steps of the Brazilian Santo Daime religion in Europe Curare 28 (2005), pp. 55-66. Tupper, K. W. The globalization of ayahuasca: harm reduction or benefit maximization? International Journal of Drug Policy 19 (2006): 297-303.
27. Balzer, C. Wege zum Heil: Die Barquinha. Eine ethnologische Studie zu Transformation und Heilung in den Ayahuasca-Ritualen einer brasilianischen Religion. Mettingen: Institut für Brasilienkunde, 2003.
28. For (potential) interactions with other medications see Wyatt, R. J., E. H. Cannon, D. M. Stoff and J. C. Gillin. Interactions of hallucinogens at the clinical level. Ann N Y Acad Sci 281 (1976): 456-486.