

Salvia

Salvia (*Salvia divinorum*) is an herb common to southern Mexico and Central and South America. The main active ingredient in Salvia, salvinorin A, is a potent activator of kappa opioid receptors in the brain.^{1,2} These receptors differ from those activated by the more commonly known opioids, such as heroin and morphine.

Traditionally, *S. divinorum* has been ingested by chewing fresh leaves or by drinking their extracted juices. The dried leaves of *S. divinorum* can also be smoked as a joint, consumed in water pipes, or vaporized and inhaled. Although Salvia currently is not a drug regulated by the Controlled Substances Act, several States and countries have passed legislation to regulate its use.³ The Drug Enforcement Agency has listed Salvia as a drug of concern and is considering classifying it as a Schedule I drug, like LSD or marijuana.

Health/Behavioral Effects

People who abuse Salvia generally experience hallucinations or “psychotomimetic” episodes (a transient experience that mimics a psychosis).^{4,5} Subjective effects have been described as

intense but short-lived, appearing in less than 1 minute and lasting less than 30 minutes. They include psychedelic-like changes in visual perception, mood and body sensations, emotional swings, feelings of detachment, and importantly, a highly modified perception of external reality and the self, leading to a decreased ability to interact with one’s surroundings.⁵ This last effect has prompted concern about the dangers of driving under the influence of salvinorin. The long-term effects of Salvia abuse have not been investigated systematically. Recent experiments in rodents demonstrated deleterious effects of salvinorin A on learning and memory.⁶

Extent of Use

NIDA’s Monitoring the Future Survey of 8th, 10th, and 12th graders asked about Salvia abuse for the first time in 2009—5.7 percent of high school seniors reported past-year use (greater than the percent reporting ecstasy use). And according to the latest MTF figures the use of Salvia reported by 8th, 10th, and 12th graders remained unchanged from 2010 to 2011, with 1.6 percent of 8th graders, 3.9 percent of 10th graders, and 5.9 percent of 12th graders reporting past-

year abuse. Although information about this drug is limited, its abuse is likely driven by drug-related videos and information on Internet sites.³ Because of the nature of the drug's effects, its use may be restricted to individual experimentalists, rather than as a social or party drug.⁵

Other Information Sources

For more information on the effects of hallucinogenic drugs, see NIDA's *Research Report on Hallucinogens and Dissociative Drugs* at www.nida.nih.gov/ResearchReports/hallucinogens/hallucinogens.html.

For more information on *Salvia divinorum* and the Controlled Substances Act, visit http://www.deadiversion.usdoj.gov/drugs_concern/salvia_d.pdf.

References

¹Chavkin, C., Sud, S., Jin, W., et al. Salvinorin A, an active component of the hallucinogenic sage *Salvia divinorum* is a highly efficacious kappa-opioid receptor agonist: structural and functional considerations. *J Pharmacol Exp Ther.* 308:1197–1203, 2004.

²Harding, W.W., et al. Salvinicins A and B, new neoclerodane diterpenes from *Salvia divinorum*. *Organic Letters.* 7:3017–3020, 2005.

³http://www.deadiversion.usdoj.gov/drugs_concern/salvia_d.pdf. Accessed September 24, 2007.

⁴Roth, B.L., et al. Salvinorin A: a potent naturally occurring non-nitrogenous kappa opioid selective agonist. *Proc Natl Acad Sci.* 99:11934–11939, 2002.

⁵Gonzalez, D., et al. Pattern of use and subjective effects of *Salvia divinorum* among recreational users. *Drug Alcohol Depend.* 85:157–162, 2006.

⁶Braida, D., Donzelli, A., Martucci, R., et al. Learning and memory impairment induced by Salvinorin A, the principal ingredient of *Salvia divinorum*, in Wistar rats. *Int J Toxicol.* Epub ahead of print, September 29, 2011.