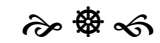


Salvia divinorum



INFORMATION CONCERNING
THE PLANT AND
ITS ACTIVE PRINCIPLE

H.R. 5607

Center for Cognitive Liberty & Ethics

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Salvia divinorum



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SOURCES FOR MORE INFORMATION

Toxic Exposure Surveillance System (TESS)

American Association of Poison Control Centers
Telephone: (202) 362-7217
E-mail: aapcc@poison.org
Web site: www.aapcc.org/poison1.htm

PubMed (National Library of Medicine)

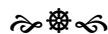
Web site: <http://www4.ncbi.nlm.nih.gov/PubMed/>

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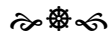
Salvia divinorum

TABLE OF CONTENTS

Executive Summary.....	6
Background.....	7
Description, Composition and Effects	8
Availability & Abuse Potential	10
Actual & Potential Medical Use	12
Scheduling Issues	13
Summary & Recommendations.....	15
Bibliography	16
Sources for Additional Information	17

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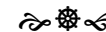


EXECUTIVE SUMMARY

The plant *Salvia divinorum* was virtually unknown to North Americans until a *New York Times* article (Jones 2001) created a spike of interest in the plant as a legal hallucinogen.

Recent studies indicate that *S. divinorum* and/or its active principle may have “significant research and therapeutic potential in fields such as psychopharmacology, psychiatry and complementary disciplines such as herbal medicine” (Hanes 2001).

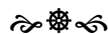
Because its abuse potential is low and its medical potential significant, placement of *S. divinorum* or its active principle, salvinorin A, in Schedule I of the Controlled Substances Act is unwarranted and inappropriate.



SUMMARY & RECOMMENDATIONS

Salvia divinorum is a powerfully psychoactive plant, which until recently remained unknown to all but a specialized subset of ethnobotanists. The plant’s bitter taste, unpredictable and occasionally disturbing short-term mental effects, combined with exacting cultivation parameters, make it an unlikely candidate for widespread use. Thus, while news coverage periodically produces a spike of interest in the plant as a “legal hallucinogen,” use of the plant is not expected to ever reach the level experienced with other illegal drugs.

Neither *S. divinorum* nor salvinorin A have a “high potential for abuse,” and recent scientific studies, supported by ethnobotanical data, strongly suggest possible therapeutic applications that warrant further investigation. Accordingly, neither the plant nor its active principle are appropriate candidates for placement in Schedule I. Education aimed at raising awareness of the plant’s unpredictable and occasionally upsetting psychoactive effects, rather than criminal prohibition, is key to reducing individual and social harm with respect to *Salvia divinorum* and its active principle.



In order to place *S. divinorum* or salvinorin A in Schedule I of the Controlled Substances Act, three criteria must be satisfied. The plant must be shown to have: (1) a high potential for abuse; and (2) no currently accepted medical use in treatment in the United States, and (3) a lack of accepted safety for use under medical supervision (21 U.S.C. Sec. 812(b)).

Placement of the plant or chemical in Schedule I cannot be scientifically justified. The plant and chemical have minimal abuse potential and no addictive potential. Recent studies published in peer-reviewed scientific journals have emphasized that further studies with salvinorin A and/or *S. divinorum* may lead to the development of “novel psychotherapeutic compounds” (Roth 2002) with “significant research and therapeutic potential in fields such as psychopharmacology, psychiatry and complementary disciplines such as herbal medicine” (Hanes 2001). These findings are supported by ethnobotanical data. Available data supports the safety of using *S. divinorum* or salvinorin A under medical supervision. Schedule I status for salvinorin A or its parent plant would seriously inhibit scientific research that has the potential to understand novel neurotransmitter systems of great importance to the advancement of neuropharmacological research and the treatment of disease.



Salvia divinorum

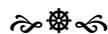
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BACKGROUND

Global flora is rife with species exhibiting psychoactive properties. A recent survey listed 250 plants that naturally produce controlled substances (Ott 1993), and the overall number of psychoactive plant species is undoubtedly much larger. One among a multitude of lesser-known psychoactive plants is *Salvia divinorum*, a plant native to the Sierra Mazateca in Mexico, and first introduced to the United States in 1962 (Hofmann 1990, Wasson 1962).

Salvia divinorum is a member of the Labiatae or Mint family, one of the largest families of angiosperms, which includes many ornamental, culinary and medicinal herbs in common use throughout the world. Close relatives include the spices basil, mint (*Mentha*), common sage (*Salvia officinalis*), rosemary and thyme. This family is also a rich source of essential oils, including isomenthone, isopinocampone, carvone, menthol, and methyl acetate. Many related species, such as peppermint or *yerba buena*, have been valued throughout history by the Assyrians, Babylonians, Chinese,



Arabs, Greeks and Romans for their medicinal properties. These species are still utilized in this capacity by indigenous cultures around the globe, including Native Mexicans.

As its name reflects, *Salvia divinorum* (translation: “Diviner’s Sage” or “Sage of Seers”) is traditionally employed by the Mazatec Indians in medico-magical-divination ceremonies (Epling & Játiva 1962). To the Mazatec, *S. divinorum* provides numerous therapeutic applications. Infusions of the plant are administered in a ceremonial context and are used for a variety of complaints, including diarrhea, headache, rheumatism and anemia. Mazatec shamans use *S. divinorum* as a vision-inducing plant. They say it “allows them to travel to heaven and talk to God and the Saints about divination, diagnosis, and healing” (Rovinsky & Civadlo 1998).

DESCRIPTION, COMPOSITION & EFFECTS

Salvia divinorum is also known, in Mazatec, as *Ska Pastora* or *Ska María Pastora*, meaning “Leaves of the Shepherdess” or “Leaves of Mary the Shepherdess.” In Náhuatl it is named *Pipiltzintzintli*, and in Spanish, *la Hembra* or *Hojas de Pastora*. In English, it is commonly referred to as Magic Mint, or more properly by its direct translation from Latin, “Diviner’s Sage” or “Seer’s Sage.”

The plant is a perennial herb with flowering stems growing two or even three meters tall. This plant has never been observed to set seed in the wild, and can be found to flower from May to September, in white with a light blue tinge.



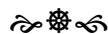
2 and has maintained this improvement for the last 6 months, showing no signs of relapse and reporting only minimal side effects, such as occasional lightheadedness for up to 1 hour after using the herb” (Hanes 2001). The author of the Case Report concluded:

...it is not inconceivable that research using the active ingredients from this herb may pinpoint a unique mechanism of antidepressant action for these compounds. This, in turn, could lead to methods for the management of depression or of treatment-resistant subtypes of this condition... We may be dealing with a highly novel agent that has significant research and therapeutic potential in fields such as psychopharmacology, psychiatry and complementary disciplines such as herbal medicine” (Hanes 2001).

SCHEDULING ISSUES

Salvia divinorum is not scheduled under the federal Controlled Substances Act, nor is it controlled under any state laws. Its active principle, salvinorin A, is likewise unscheduled under Federal or state law.

Salvinorin A’s chemical structure appears to be unique among other psychoactive molecules, and among existing controlled substances (Valdés 1994). Because it is not “substantially similar” in chemical structure to an existing controlled substance, salvinorin A does not fall within the Controlled Substance Analogue Act (21 USC 802(32)(A)).



ACTUAL & POTENTIAL MEDICAL USE

For centuries, the Mazatec Indians have used the plant *Salvia divinorum* in healing ceremonies, gaining relief from anaemia, headache, and rheumatism (Valdés 1983).

Until very recently, the precise neurotransmitter receptors used by salvinorin A were unknown, despite a battery of NovaScreen® tests. However, in Fall 2002 a team of researchers published their findings that Salvinorin A is a potent kappa opioid receptor agonist (Roth 2002). The researchers noted that salvinorin A's affinity for kappa opioid receptors was surprising and that this held promise for developing entirely new psychiatric medicines:

Salvinorin A thus represents, to our knowledge, the first naturally occurring nonnitrogenous opioid-receptor subtype-selective agonist. Because Salvinorin A is a psychotomimetic selective for kappa opioid receptors, kappa opioid-selective antagonists may represent novel psychotherapeutic compounds for diseases manifested by perceptual distortions (e.g., schizophrenia, dementia, and bipolar disorders) (Roth 2002).

An article in the *Journal of Clinical Psychopharmacology* reported on "Ms. G" a 26-year-old woman with a history of unrelenting depression, who eventually found relief in *Salvia divinorum*. Having found that other medications failed to provide satisfactory relief, Ms. G self-medicated with an oral dose of *Salvia divinorum* leaves three times per week. As a result of her use of *Salvia divinorum*, "she has continued to show a total remission of her symptoms of depression according to HAM-D scores in the range of 0–

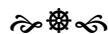


Despite its availability to science over the last few decades, investigation and use of *S. divinorum* or its primary psychoactive substance, salvinorin A (a diterpenoid agent devoid of nitrogen), remain quite limited. Examination of the PubMed database of the National Library of Medicine results in only five citations (Giroud 2000, Valdés 1994, Siebert 1994, Valdés 1986, and Valdés 1983).

There are several reasons why so little information about either *S. divinorum*, or salvinorin A exists in the medical literature. Firstly, until August 2002, the precise neurotransmitter receptors with an affinity for salvinorin A were unknown. In August 2002, however, a team of researchers published their findings that salvinorin A binds to kappa opioid receptors. (Roth 2002).

Secondly, cultivation of *S. divinorum* is relatively exacting, and commerce in the plant is presently limited. Thirdly, the plant and chemical seem to have little innate toxicity. Animal studies stimulate decreases in movements without sedation (Valdés 1994). Administration of huge doses of salvinorin A to rats produced no observable subsequent sequelae on behavior (Valdés 1987).

More importantly, *S. divinorum* is uniformly acknowledged as a difficult agent to employ, with a steep "learning curve." It is virtually inactive orally because salvinorin A is insoluble in water. The intense bitterness of the leaves is a hindrance to many, while smoking the leaves requires rapid inhalation of large volumes of smoke. The plant's psychoactive effects are inconsistent and evanescent. Even the isolated chemical is



associated with very transient effects in humans. Few consider the psychoactive effects pleasurable, and most people choose not to repeat the experience after one exposure. Many describe the appearance of geometric shapes in the vision, while at higher doses, a brief dissociative effect, “out-of-body experience,” or true hallucination may be produced.

AVAILABILITY & ABUSE POTENTIAL

Salvia divinorum is endemic only to the Mazatec zone of the Sierra Madre Oriental, in the Mexican state of Oaxaca. It is propagated vegetatively, and because the only specimens observed in its native habitat were known to be planted by Mazatecs, it is assumed by most to be a cultigen. Cultivation by non-Mazatecs in more northern latitudes has been accomplished, but it is difficult, demanding a high degree of technical skill. The plant requires rich soil and abundant moisture, tolerating sun only if soil moisture remains high and humidity is sustained.

Numerous Internet sites provide descriptions of *S. divinorum* and its mind-altering powers. Some of the sites accentuate the unpleasant and antisocial effects of using *S. divinorum*, while others describe the “spiritual dimension” of its traditional use. Some Internet sites are used to post information about its cultivation and use, and a few herbalists conduct business online selling cuttings and leaf. Interestingly, many Internet postings recounting personal experiences include stern warnings regarding the plant’s potentially disturbing psychoactive effects.



Accounts of serious medical sequelae or statistics on emergency visits related to use of the plant or chemical are virtually nonexistent. No citations were uncovered in a search of the *Morbidity and Mortality Weekly Report*.

The Toxic Exposure Surveillance System (TESS) maintained by the American Association of Poison Control Centers has no reports of *S. divinorum*-specific poisonings. (Litovitz 2000).

No cases of dependency on *S. divinorum* or salvinorin A are reported in the literature. Aside from rare reports of pervasive anxiety-associated “bad” experiences with their usage, no cases of psychotic deterioration or other medical complications are known.

Any danger from the use of the plant or chemical arises from anxiety reactions, or the possibility of accidents secondary to users ambulating or pursuing other activities while visually impaired. Anxiety reactions are generally self-limited due to the brief duration of effects, and respond to quiet reassurance. Additionally, extraneous noise or even opening the eyes may totally terminate the psychoactive effects.

Unlike other dissociative plant agents subject to occasional recreational use, such as *Datura* spp. or *Brugmansia* spp., *Salvia divinorum* and its active ingredient salvinorin A are short acting and lack any known tissue toxicity, gastrointestinal or cardiovascular sequelae.