



SALVIA DIVINORUM AND SALVINORIN A **(Street Names: Maria Pastora, Sage of the Seers, Diviner's Sage, Salvia, Sally-D, Magic Mint)**

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Introduction:

Salvia divinorum is a perennial herb in the mint family native to certain areas of the Sierra Mazateca region of Oaxaca, Mexico. The plant, which can grow to over three feet in height, has large green leaves, hollow square stems and white flowers with purple calyces, can also be grown successfully outside of this region. *Salvia divinorum* has been used by the Mazatec Indians for its ritual divination and healing. The active constituent of *Salvia divinorum* has been identified as salvinorin A. Currently, neither *Salvia divinorum* nor any of its constituents, including salvinorin A, are controlled under the federal Controlled Substances Act (CSA).

Licit Uses:

Neither *Salvia divinorum* nor its active constituent salvinorin A has an approved medical use in the U.S.

Chemistry and Pharmacology:

Salvinorin A, also called Divinorin A, is believed to be the ingredient responsible for the hallucinogenic effects of *Salvia divinorum*. Chemically, it is a neoclerodane diterpene found primarily in the leaves, and to a lesser extent in the stems of the plant. Although several other substances have been isolated from the plant, none have been shown to be psychoactive.

In the U.S., plant material is typically either chewed or smoked for its psychoactive effects. When chewed, the leaf mass and juice are maintained within the cheek area with absorption occurring across the lining of the oral mucosa (buccal). Effects first appear within 5 to 10 minutes. Dried leaves, as well as extract-enhanced leaves purported to be enriched with salvinorin A, are also smoked. Smoking pure salvinorin A, at a dose of 200-500 micrograms, results in effects within 30 seconds and lasts about 30 minutes.

Several studies have reported the effects of using either plant material or salvinorin A. Psychic effects include perceptions of bright lights, vivid colors and shapes, as well as body movements and body or object distortions. Other effects include dysphoria, uncontrolled laughter, a sense of loss of body, overlapping realities, and hallucinations (seeing objects that are not present). Adverse physical effects may include incoordination, dizziness, and slurred speech.

Scientific studies show that salvinorin A is a potent and selective kappa opioid receptor agonist. Other drugs that act at the kappa opioid receptor also produce hallucinogenic effects and dysphoria similar to those produced by salvinorin A. Salvinorin A does not activate the serotonin 2A receptor, which mediates the effects of other schedule I hallucinogens.

Illicit Uses:

Salvinorin A and *Salvia divinorum* products are abused for their ability to evoke hallucinogenic effects, which, in general, are similar to those of other scheduled

hallucinogenic substances.

User Population:

According to the National Survey on Drug Use and Health (NSDUH) Report: *Use of Specific Hallucinogens 2006* published by SAMHSA in February 2008, it is estimated that 1.8 million persons aged 12 or older used *Salvia divinorum* in their lifetime, and approximately 750,000 did so in the past year (i.e., 2006). Use was more common among young adults (18 to 25 years old) as opposed to adults aged 26 and older. Young adults were nearly three times more likely than youths aged 12 to 17 to have used *Salvia divinorum* in the past year. Use is more common in males than females among youth and young adults, according to NSDUH.

According to DEA's National Forensic Laboratory Information System (NFLIS) and System to Retrieve Information From Drug Evidence (STRIDE), federal, state and local law enforcement officials encountered 103 drug exhibits in 2011, 100 drug exhibits in 2012, and 40 exhibits in the first six months of 2013 identified as *Salvia divinorum* or salvinorin A.

The Monitoring the Future survey reports that in 2012, 1.4% of 8th graders, 2.5% of 10th graders, and 4.4% of 12th graders used "Salvia" in the past year.

Illicit Distribution:

Salvia divinorum is grown domestically and imported from Mexico and Central and South America. The Internet is used for the promotion and distribution of *Salvia divinorum*. It is sold as seeds, plant cuttings, whole plants, fresh and dried leaves, extract-enhanced leaves of various strengths (e.g., 5x, 10x, 20x, 30x), and liquid extracts purported to contain salvinorin A. These products are also sold at local shops (e.g., head shops and tobacco shops).

Control Status:

Salvia divinorum and salvinorin A are not currently controlled under the Controlled Substances Act. Several states such as California, Delaware, Florida, Hawaii, Illinois, Kansas, Kentucky, Louisiana, Maine, Maryland, Minnesota, Missouri, Nebraska, North Carolina, North Dakota, Ohio, Oklahoma, Tennessee, Virginia, and Wisconsin have enacted legislation placing regulatory controls on *Salvia divinorum* and/or salvinorin A.

Salvinorin A and/or *Salvia divinorum* have been placed under regulatory controls in Australia, Belgium, Denmark, Estonia, Finland, Italy, Japan, Spain, and Sweden.

Comments and additional information are welcomed by the Drug and Chemical Evaluation Section; Fax 202-353-1263, telephone 202-307-7183 or Email ODE@usdoj.gov.