



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/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.

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).

User Population:

According to the National Survey on Drug Use and Health (NSDUH), published by SAMHSA, it is estimated that 5.3 million persons, aged 12 or older, used *Salvia divinorum* in their lifetime in 2016 in comparison to 5.1 million persons a year ago in 2015 and 1.8 million persons a decade ago in 2006. Although, in 2015, the NSDUH survey methodology was re-designed, so comparisons to previous years for trending are not equivalent or advised. For 2017 and 2018, the estimated lifetime use of *Salvia divinorum*, among persons aged 12 years and older, was 4.8 million and 5.0 million, respectively.

The Monitoring the Future (MTF) survey reported 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. But by 2016, the annual use of "salvia" declined in all populations. Still, 0.9% of 8th and 10th graders and 1.8% of 12th graders reported some past-year use in 2016, but the college and young adult populations had prevalence levels at or below 0.8%. For 2017 and 2018, the overall past year use prevalence of "Salvia," among 8th, 10th, and 12th graders, continued to decline at (0.4%, 0.9%, 1.50%) and (0.6%, 0.7%, 0.9%), respectively.

Illicit Distribution:

According to DEA's National Forensic Laboratory Information System (NFLIS) and System to Retrieve Information From Drug Evidence (STRIDE)/STARLiMS, federal, state and local law enforcement officials encountered 103 drug exhibits in 2011, 107 drug exhibits in 2012, and 70 exhibits in 2013 identified as *Salvia divinorum* or salvinorin A. In recent years, the drug exhibits have continued to decrease from 64 in 2014 to 31 in 2016, and 20 in 2018.

Control Status:

Salvia divinorum and salvinorin A are not currently controlled under the Controlled Substances Act.

Comments and additional information are welcomed by the Drug and Chemical Evaluation Section; Fax 571-362-4250, Telephone 571-362-3249, or Email DPE@usdoj.gov.