

The soothing
sensation that is bath
salts



**ASSIGN
BUSTER**

The Soothing Sensation That is Bath Salts Introduction “ Oh yeah, me and my girlfriend have a big bag of lavender bath salts sitting at home,” was the initial reaction when I asked a fellow engineer to portray as a testimonial for our borderline inappropriate bath salts infomercial. Contrary to popular belief, this new synthetic drug is far away from producing any effects that are similar to that of a relaxing bath. Until recently, bath salts were popularized to be a “ legal high. In order to tip toe around the federal drug regulatory laws, bath salts were marked with a warning label that mentioned “ not for human consumption. ” In South Carolina, before the ban on October 24th 2011, bath salts could be purchased at one of the many head shops, gas stations, and even online. The appearance of the drug itself is usually in a powdered form that is sold within a package that is very aesthetically pleasing. These packages are sold under a variety of appealing names such as Ivory Wave, Vanilla Sky, Bliss, Blue Silk and etc.

The composition of the synthetic drug bath salts can vary from dealer to dealer. Sometimes you may find traces of other stimulant drugs such as cocaine, amphetamines, or ecstasy, but the most important culprit in bath salts is 3, 4-methylenedioxypyrovalerone (MDPV). MDPV falls under the category of phenethylamines and it is structurally related to synthetic cathinones. Synthetic cathinones are a group of drugs that are derivatives of the natural plant *Catha edulis* (also known khat), that contain the chemical phenylalkylamine alkaloid (Coppola, 2011).

The remainder of the paper will provide some of the current available information such as pharmacokinetics, neurophysiology, and a brief discussion about MDPV as the primary active ingredient in bath salts.

Pharmacokinetics The routes of administration of bath salts are similar to that of drugs in the “ salt” class. The most common method is insufflation which results in faster onset of the effects but does not have a long duration. There are also other routes of administration preferred by drug enthusiasts; these mechanisms include parietal injections, intravenously, “ bombing,” and also rectal administration.

The “ bombing” method involves putting the salt crystals in to cigarette paper to form a capsule and then simply swallowing it. The rectal administration requires an individual to dissolve the salt crystals in a type of liquid vehicle (i. e. water) and then introduce the liquid to the rectum via the anus. The absorption of MDPV is primarily dependent on the route of administration. The nasal route obviously has the quickest absorption. On the other hand, the oral administration is absorbed poorly because when taken orally, the rate of absorption compares to that of cocaine.

The metabolism of MDPV in the human liver occurs similarly to that of other synthetic cathinone. The process involves multiple steps and the last of which is where the catechol ring of MDPV is methylated by COMT (Prosser, 2011). COMT is one of several enzymes that are involved in the degradation of catecholamines (i. e. dopamine, norepinephrine, and epinephrine). Finally, after the metabolism, the excretion of MDPV waste occurs through the urine or feces. Since there are no published, the duration of the effects of MDPV must be recorded with the word of mouth from experienced users.

The drug effects start presenting themselves approximately 10-20 minutes after nasal administration and duration is close to 2. 5 hours. With oral administration, users report the effect to set in between 15-45 minutes after

ingestion and the duration can last anywhere from 3-4 hours (in rare cases as much as 12 hrs) (Psychonaut, 2009). Neurophysiology As mentioned previously, due to the limited amount of available information for understanding the mechanism of physiological action of MDPV, the neurophysiology is theorized to have a similar mechanism to that of amphetamines and MDMA.

This comparison is highly based on the structural similarities between amphetamines and synthetic cathinones (Prosser, 2011). The effects of amphetamines and their derivatives are produced by the three-fold effect on monoamine synapses. First, amphetamine-like drugs cause a leakage of neurotransmitters (NTs) from the presynaptic vesicles into the synaptic cleft. Second, they also increase the amount of NTs released in response to an action potential.

Finally, there is an inhibition of monoamine reuptake from the synaptic cleft. As a result of the three-fold effect, there is an increase in concentration of NTs in the synaptic cleft which prolongs and enhances the effect of MDPV. Effects of MDPV on the Mind and Body Similar to most highly abused substances, MDPV has a laundry list of physical and psychological effects, including both desired and undesired. This data of effects is generated from first hand users and from the thousands of hospital admissions.

With initial administration of MDPV, users can feel some desired effects that are not necessarily harmful (including but not limited to): increased energy, increased sociability, mild euphoria, increased concentration, sexual arousal (Coppola, 2011 & Psychonaut 2009). Individuals that experience these non-harmful side effects are considered to be very lucky because on the other

side of the coin are some very serious undesired psychoactive side effects. These undesired effects include extreme paranoia, delusional thinking, visual & auditory hallucinations, self-mutilation, insomnia, violence, and restlessness (Prosser, 2011).

Side effects of MDPV travels in pairs, if it affects the mind it will also have an effect on the body. Effects on the body include hypertension, tachycardia, chest pains, vasoconstriction, muscle twitches, bruxism, insomnia, and lack of appetite (Psychonaut, 2009). Currently, there is no effective treatment against MDPV overdose. The only method that is considered is to treat the physiological symptoms as they rise in order to prevent the individual from cause harm to themselves or others.

To integrate all of the information I have provided in the paper thus far, I will present one of the many case studies that were published by medical doctors after this dramatic increase in hospital admissions as a consequence of MDPV psychosis. A 27-year-old female named J. H was brought to the emergency room by the local police after they received multiple phone calls reporting an assailant breaking into their home. Upon arrival of the police, they were notified that there was a dead body in the hallway and that the homeowners were next for being killed. The police soon deduced that J. H. as suffering from paranoid delusions. In the emergency room, J. H. presented with hypertension, tachycardia, diaphoresis, and extreme fear but there were no sign of a physical disorder. When the results for her complete blood count, the comprehensive metabolic panel and the drug urine test returned completely unremarkable, she was transferred to the hospital's psychiatric unit. The psychiatric staff recorded that she had a disorganized thought

process, poor memory and was still convinced that she was in imminent danger. The only option for the doctors that was available was to start J. H. n treatment for Schizophrenia. The following day, her condition mildly improved and she was able to inform the doctors about the events that resulted with her being hospitalized. Apparently, she had a past history of opiate dependence, and one day, her and her boyfriend discovered bath salts, under the name of " Powdered Rush," at a local head shop. They admitted to being on a binge period by insufflation for about five to six days prior to admission. The doctors concluded that paranoid psychosis from MDPV developed very much like that seen with methamphetamines and other psychostimulants.

After three to four days of sleep deprivation, there was an onset of paranoid psychosis symptoms. She was released from the hospital a few days later after she was able to recover from sleep exhaustion (Antonowicz, 2011).

Discussion As of November 2011, it was reported that there is currently no research that focuses on addiction and withdrawal related to synthetic cathinones (Prosser, 2011). This means that conclusions about MDPV related addiction, dependence, and withdrawal must be extrapolated from other drugs that are similar in structure and mechanism of action.

As discussed previously, the mechanism of MDPV is by inhibiting the reuptake of catecholamines to produce strong stimulant effects. MDPV stimulates the ventral tegmental area to release more dopamine, which in turn will project to multiple areas of the brain: prefrontal cortex (PFC), nucleus accumbens (NAcc), and the hippocampus. All of these structures contribute to the conditioning and reinforcing behavior of MDPV. Since the

reuptake of dopamine is inhibited, there is going to be an increase in the concentration of dopamine in the synaptic cleft.

One can imagine the addictive, dependence, and tolerance properties of MDPV to be a combination of the properties of morphine, cocaine, and ecstasy. To elaborate, the pattern of administration of MDPV resembles to morphine because there is a slow increase in the dose over time required to acquire the necessary effect. Then the administration pattern of ecstasy also factors in because of cravings it causes. When an individual abuses ecstasy the serotonin will become scarce over time due to overstimulation.

The low levels of serotonin will cause the individual to crave more ecstasy, but no amount of ecstasy will help. Similarly, the over production of MDPV causes the catecholamines to run low in supply and cause the addict to crave more. Finally, the other pattern that contributes to MDPV resembles the administration pattern of cocaine. The components of cocaine administration pattern that is relative to MDPV are the binge and exhaustion periods. Individuals will abuse MDPV for a period of time and due to sleep deprivation the individual will crash.

In conclusion, when we integrate the three patterns together, the overall pattern of MDPV will show an increase in dose of administration until the individual either crashes from exhaustion or passes away due to an event that occurred in psychosis. When viewing the overall pattern of MDPV use, it is easy to see that majority of the time this drug can be extremely harmful. But, some users report that when MDPV is ingested at low doses, it produces a stimulant effect that is similar to methylphenidate. This glimpse of

reported user experiences can make MDPV a candidate for ADD/ADHD treatment (Psychonaut, 2009).

One of the factors that can increase the frequency of abuse of MDPV is the marketing of the bath salts themselves. The overall design and nomenclature that the bath salts are sold under are very aesthetically pleasing. Through personal experience, prior to the ban of bath salts, the price was very affordable when compared to the quality of effect (approximately \$18 for 50 mg). Now after the federal ban, the price of some bath salts online range from \$900 to \$2200 for a large quantity. Many news reports suggest that there is a common misconception of harm when it comes to substances such as bath salts or other similar "legal" substances.

Just because there are substances that seem to sneak around the drug regulations, they should be assumed as being safe. Statistics from the American Association of Poison Control Centers state that there were 1782 calls nationwide to poison centers about designer drugs labeled as "bath salts" just during the first four months of 2011. This was an exponential increase when compared to just 302 calls in all of 2010 (AAPCC). Mark Ryan, director of the Louisiana Poison Center, writes a quote for an article on Drugs.com that said: "If you take the very worst effects of the illegal drugs LSD and Ecstasy with their hallucinogenic, delusional type properties, and combine them with the extreme agitation, superhuman strength and combativeness of PCP, as well as the stimulant properties of cocaine and methamphetamines, you have summarized the potential negative effects of bath salts use." In conclusion, there has been a dramatic increase in the abuse of bath salts with the primary ingredient being MDPV. The current

approach of gathering information for the mechanism of action of MDPV is mostly done by modulating the internet.

Despite the lack of research on synthetic cathinones, individuals still take the risk to abuse MDPV. But based on similarities found between MDPV and other stimulants, we can theorize the mechanisms of action in the central nervous system. In my opinion, if you have not exposed yourself to MDPV it would be a wise decision to keep it that way because, metaphorically speaking, MDPV is like your girlfriend; it not only screws with your body but also your mind. :) (I thought I would put a smiley face so that I can actually get to see it).

References

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