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# Abuse of Synthetic Cannabinoids in the World of Forensic Science

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## ABSTRACT

Synthetic Cannabinoids are among recently synthetized medicines. Cannabis are most illegally use for all over world for many years. These Synthetic Cannabinoids complexes were used by scientists to isolate the medicinal effects of natural cannabis. Synthetic cannabinoids are chemicals that bind to cannabinoid receptors and produce effects like to those of tetrahydrocannabinol. The plant contains a hallucinations chemical called delta-9-tetrahydrocannabinol (THC). The overdose of use these compounds resulted on the spot death. The National Forensic Laboratory Information System (NFLIS) united States are collects drug report information synthetic cannabinoids. These synthetic cannabinoids drug are also used in the date rape drug to sexual assault. Cannabinoids specifically interact with these membrane-bound receptors in order to produce their physiological or psychological and behavioral effects.

***Key-Words:*** Synthetic Cannabinoids, cannabis, Drug, Effect, etc.

## INTRODUCTION

Cannabis is the most frequently used recreational drug, mainly among teens and young adults, [1] although its legal status and patterns of use are rapidly changing. Currently 18 states and the District of Columbia have laws permitting and regulating the possession of marijuana for medical purposes. [2] Six additional states have legislature incomplete to legalize the medical use of marijuana. Two states, Washington. [3] Synthetic cannabinoids are new psychoactive substances (NPS) similar to marijuana. Synthetic cannabinoids were first manufactured as early as the 1970's complete academic research centers and pharmaceutical industries in order to mimic the medicinal effects of cannabis and without the psychoactive effects. [4] Cannabis is primarily abused for its psychoactive effects, (e.g., subjective euphoria, relaxation, and elevated mood), attributed to its main psychoactive constituent Δ9-tetrahydrocannabinol (Δ9-THC). Since the discovery of Δ9-THC, hundreds of novel analogues have been synthesized and used as therapeutic agents, as pharmacologic tools to enhance our understanding of the endocannabinoid system (see below), and most recently, as recreational drugs of abuse. Across the United States, commercial preparations of synthetic cannabinoids (SCBs) (e.g., labeled "K2" or "Spice") have gained much attention among drug users and lawmakers. According to a 2012 survey, SCBs are the second-most commonly used illegal drug among young adults, with only cannabis use occurring at a higher rate. [5] Spice products have been available in several European countries such as Germany, Switzerland and Great Britain since 2004. Initially not popular, they were used by only a small group of "experimental" users. In Europe, towards the end of 2008, it appeared that Spice was not so innocuous as it was initially thought. [6] In 2008, forensic Experts in Germany and Austria identification the initial psychoactive component of Spice crops: AminoalkylindoleJWH-018. [7,8] In many different brands called Spice, the same product was found to vary both with regard to amount and the type of synthetic cannabinoids added. [9-12]

**Synthetic Cannabinoids are not Marijuana/Cannabis**

While these illegal resources are usually mentioned to as synthetic cannabinoids, cannabinoid receptor agonists, cannabimimetic agents, Spice, artificial marijuana, or even legal marijuana, they must not be confused with marijuana/ cannabis or the legal synthetic cannabinoids/cannabinoid receptor agonists. [13-15] Illegal artificial cannabinoids/Spice are not marijuana/ cannabis, but slightly a collection of many laboratory chemicals that interact with the cannabinoid receptor in the brain to mimic marijuana to induce a marijuana-like high. [15] The synthetic chemicals designed to mimic marijuana bind to the same cannabinoid receptors in the brain as delta 9-tetrahydrocannabinol (D9-THC), the primary psychoactive component of marijuana. [14]

**Synthetic Cannabinoids are Normally more Effective than Marijuana/Cannabis**

One purpose Spice may be added powerful than marijuana is because the chemical mechanisms bind additional powerfully to the cannabinoid receptor in the brain; they also may interact with other receptors in the brain that marijuana does not. [14] Symptoms may resolve impulsively without involvement and vary, including mild to moderate intoxication-like signs, nausea, emesis, weakness, tachycardia, hypertension, and agitation. [13,16] Several news reports have described customers in conditions of "excited delirium," significantly agitated, tearing off their clothes, and sweating profusely. Severe symptoms include significant cardiac arrhythmias, myocardial infarction, psychosis, respiratory depression, flaccid paralysis, hyperthermia, rhabdomyolysis, seizures, coma, and even death. [13,16,17] Intoxication management usually centers on airway, breathing, circulation, and life-threatening issues first, followed by supportive care. [16,17] Fluid resuscitation may be needed, as well as electrolyte correction. [14] Benzodiazepines are usually first line treatment for anxiety/agitation; physical restraint may be necessary. [16-18] Significant psychosis with behavioral disturbances can occur, which may not be calmed with typical methods; in these instances, antipsychotics may be helpful. [17,18] Anecdotally, in our state, some of the patients presented with significant psychotic behaviors; the atypical antipsychotics seemed to assist more than the benzodiazepines in those cases. However, caution should be used with antipsychotics and other medications that can decrease seizure threshold as there have been reports of synthetic cannabinoids causing seizures. [16,17]

**Definition/Structural classification of synthetic cannabinoids**

Synthetic cannabinoids are mentioned to as materials with mechanical feature which permit required to one of the recognized cannabinoid receptors, i.e. CB1 or CB2, present-day in human cells and complexes with similar chemical structures. The CB1 receptor is placed mostly in the brain and spinal cord and is accountable for the representative physiological and mainly the psychotropic belongings of cannabis, whereas the CB2 receptor is located mainly in the spleen and cells of the immune system and may mediate immune-modulatory effects. [19-21] Synthetic cannabinoids can be divided into cannabinomimetics which symptom cannabis-like pharmacological act (mostly agonists at CB1); challengers which bind to one of the CB receptors without manufacturing cannabis-like effects but blocking the receptors for other compounds, and substances which do not bind to these receptors significantly and hence do not have pharmacological effects mediated by one of these two receptors. The classification of the synthetic cannabinoids, based on the chemical structures of the molecules. [22,23] This classification, shown below, has also been referred to in a report by the British Advisory Council on the Misuse of Drugs (ACMD) which deals with the generic definition of synthetic cannabinoids. [24,25]

**What is Spice?**

Spice is a nickname for an herbal mixture having one or more of a group of drugs called synthetic cannabinoids. Spice was originally a product name of a drug, retailed as a 'legal high' along with other brand names like Black Mamba, Annihilation, Exodus Damnation and Happy Joker. They controlled a non-psychoactive herbal smoke mixture that had been diverse through single or extra of aassemblage of drugs identified as Synthetic Cannabinoid Receptor Agonists (to give them their full name) or SCRAs for short. Spice (and Mamba) are now used as nicknames for any type of herbal combination that has been coated with an SCRA. SCRAs can also seem as residues or fluids for use in e-cigarettes while in the UK SCRAs are now practically continuously smoked in an herbal form, however, SCRAs have also curved up as impurities in a numeral of further drugs. In current instances in Oldham, pure crystals of SCRAs were sold as MDMA resulting in multiple hospital admitted. [26]

**Epidemiological data of synthetic cannabinoids**

According to the EMCDDA in 2015, the prevalence of SC in the general population remains low. [6] Numerous epidemiological surveys are currently examining the prevalence of SC use. [27] The 2012 Global Drug Survey reported past-year prevalence levels of 5% among United Kingdom (UK) regular clubbers. [28] In the UK, lifetime prevalence levels for adults (16 to 64 years old) was estimated at 0.2% in 2010-2011, [29] and at 0.1% in 2011-2012. [30] In the city of Frankfurt (Germany), a lifetime use of herbal mixtures of 5% was found among students aged 15 to 18 years in 2013. [31] In France, in 2014, a global survey (18 to 64 years old adults) emphasized an experimentation level of 1.7 %. First time users are mostly men (2.3%) and 4% of them are aged under 35 years. [32] A French survey, the ESCAPAD project, highlighted that 1.7% of people aged 17 years old already have consumed SC. [33] In the United States, a past-year prevalence of SC use among 17-18 year olds of 5.8% was reported in 2014. [34] Low levels of use of Spice products were described in 14-18 year old students in Spain in 2012 with a lifetime use of 1.4%, a past-year use of 1%, and a pastmonthuse of 0.6%. [35] There are also subpopulations using frequently and chronically SC. [36] Among current marijuana and tobacco users, SC use was common and persisted despite a federal ban in the United States. The primary reasons for the use of SC-containing products seem to be to evade drug detection and to experience a cannabis-like high. [37]

**Adverse Effects**

Relatively high incidence of adverse effects associated with SC use has been documented in the literature (case reports, case studies, laboratory studies). [38,39]

**Somatic Adverse Effects**

Acute SC intoxication physical signs included dilated pupils, reddened conjunctivae, nausea and vomiting, slurred speech, shortness of breath, hypertension, tachycardia (up to 180 bpm), chest pain, muscle twitches, sweating or skin pallor. [40-42]

**Cardiovascular Effects**

Adverse cardiovascular effects associated with synthetic cannabinoid use are tachycardia, [43] tachyarrhythmia, [44] cardiotoxicity, [45] myocardial infarction, [46] QTc prolongation and torsade de pointe, especially when administering medications that have the potential to cause it. [47] Bradycardia is also reported but less frequently. [48] Both hypertension [49] and/or hypotension have also been reported. [50]

**Pulmonary Effects**

Preliminary evidence of a possible relation between synthetic cannabinoid use and lung injury has been reported. [51] Diffuse pulmonary infiltrates were found in cases of chronic inhalation of multiple synthetic cannabinoid-containing products [52] and AM- 2201. [53] Pneumonia has been described in the context of ADBPINACA use. [54] SC was also described as a potential

cause for black carbonaceous bronchoalveolar lavage. [55]

**Gastrointestinal Effects**

Hopkins and Gilchrist have described a case of cannabinoid hyperemesis syndrome involving a heavy chronic user of synthetic cannabinoids (JWH-018, JWH-073, JWH-122, AM-2201 and AM- 694). [56] These effects have yet only been described in the framework of this single case analysis and have to be confirmed in further studies. [57]

**Nephrotoxic Effects**

The kidneys can be injured in diverse ways by SC use [58] Acute kidney injury has been reported, [49,59] related to XLR-11 [60] and other SC use. [61-63] Effects reported include vomiting, flank pain, abdominal pain, and increased urinary creatinine concentrations. [61] Rhabdomyolysis has been described. [64-66]

**Dermatologic Effects**

A study found that the most frequent dermatologic complaints in SC users were periorbital darkening, hallowed-cheeks and premature aging, hair loss and gray hair, and acnes. [67]

**Neurologic Effects**

The neurologic disorders associated with SC use warrant consideration, especially for clinicians faced with chronic users. Numerous neurological effects have been reported [68] including tremor, ataxia, nystagmus, fasciculations, hypertonicity, hyperflexion, and hyperextension. Drowsiness, dilated pupils, involuntary eye movement, and slow speech are also commonly reported (for review, see [69]). Serious central nervous system effects include agitation, impaired consciousness or memory, confusion, [70] hemorrhagic and ischemic stroke and emboli. [59,71-73] Seizures (JWH-018, JWH- 122, JWH-210, and AM-2201) and cognitive impairments have been described (for review, see [69]).

**Psychiatric Adverse Effects**

Psychiatric adverse effects include depressed mood, mania, [74] insomnia, hyperactivity, agitation or irritability, restlessness, anxiety, panic attack, short-term memory and other cognitive impair Self-mutilation has been reported in the framework of a case of Black Diamond use, which lead to a self-inflicted burn to the bilateral upper extremities requiring a transradial amputation of the right arm and a toe transfer procedure of the left hand after loss of all digits. [75] Catatonia has also been described following the use of SC in two patients with no previous psychosis. [76] That SC preparations contain no cannabidiol may make them more likely to induce psychosis than cannabis. [77] Symptoms such as delirium, [78] paranoid delusion, musical auditory hallucinations, disorganized thought and behavior, irrelevant speech, depersonalization, and dissociative episodes have been described. [79] Reports suggest that SC may either exacerbate previously stable psychotic symptoms (in vulnerable individuals) or trigger new-onset psychosis (in individuals with no previous history of psychosis). [80]

## DISCUSSION

Synthetic cannabinoids produce effects that have similarities to those produced by THC, they are not the same. Synthetic cannabinoids may have other biological actions, which may explain some of the variances in severity and structures of toxicity between Synthetic cannabinoids and natural cannabis. This review Paper focuses on the Prevalence of Synthetic Cannabinoids in the World of Forensic Science of synthetic drugs with cannabinoid-like effects, and describes and summarizes data from basic drug research, cannabinoid pharmacology, adverse event reports, emergency room data, case studies, and short case series to evaluate the overall adverse-effect profile and toxicology of the class of synthetic cannabinoid drugs. Also, the lack of scientific research and public awareness about the risks of synthetic cannabinoids, they will continue to be used and particularly by those who have already experienced the effects of natural cannabis. When using a targeted LC–MS/MS method, continuous analytical modifications are

required. After smoking, onset of action usually occurs within minutes, similar to cannabis use. This is due to immediate absorption via the lungs and reorganization into other body part like the brain within minutes after use. There is a delay in absorption following oral consumption due to food intake and digestion activity. Given the rapidly growing number of products appearing on the market, an open-screening approach could be a big step forward. When routine screening becomes more common, there will be a need for uniform regulations taking also into account the problem of passive inhalation, as known for THC smoke.

## CONCLUSION

The comparison of newer synthetic cannabinoids versus older ones and the drug control laws associated with these findings will confirm that the trend of synthetic cannabinoid will continue to change. To counter this growing problem, it is imperative that providers be aware of these dangerous substances and their effects on patients. Also, given the variability in clinical presentations, providers need to keep the use of synthetic cannabinoids in the differential for any patient who presents with symptoms described above. The evidence base on the harms associated with the use of synthetic cannabinoids and their management is still emerging and remains limited. Little is known about the metabolism and toxicology of synthetic cannabinoids in humans. It cannot be assumed that the risks associated with their use will be comparable with those of cannabis and there are concerns that they may have a greater potential to cause harm. synthetic cannabinoids products can also have unpredictable effects. There is emerging evidence that the risks of requiring emergency medical treatment as consequence of using synthetic cannabinoids are much greater than for natural cannabis. There is also evidence that some more recent formulations may be more potent than earlier ones and be associated with greater harms

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