Classification of Mitragynine-Related Compounds as Schedule I Controlled Substances

Section 1: Summary

The Ohio Board of Pharmacy (Board), pursuant to section 3719.44 of the Ohio Revised Code, proposes the placement of mitragynine-related compounds, which are some of the main active constituents of the plant kratom and substances synthesized from those compounds, into Schedule I.

Section 2: Background

Pursuant to section 3719.44 of the Ohio Revised Code, the Board may add or transfer a compound, mixture, preparation, or substance to Schedule I when it appears that there is a high potential for abuse, that it has no accepted medical use in treatment in this state, or that it lacks accepted safety for use in treatment under medical supervision.

In making a determination to add an unscheduled compound, the Board is required to consider the following 8 criteria:

(1) The actual or relative potential for abuse;
(2) The scientific evidence of the pharmacological effect of the substance;
(3) The state of current scientific knowledge regarding the substance;
(4) The history and current pattern of abuse;
(5) The scope, duration, and significance of abuse;
(6) The risk to the public health;
(7) The potential of the substance to produce psychic or physiological dependence liability; and
(8) Whether the substance is an immediate precursor.

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Section 3: Evaluating Mitragynine-Related Compounds Under the 8-Factor Criteria

(1) The actual or relative potential for abuse.

Mitragynine is the primary psychoactive alkaloid found in the Mitragyna speciosa plant, commonly known as kratom. Kratom has a long history of traditional use in Southeast Asia with the use of its leaf or extracts typically ingested orally for the treatment of pain and to aid in the performance of agricultural labor.[i] Although mitragynine is the most abundant alkaloid in kratom, the plant contains a number of mitragynine-related compounds, which have increased in both potency and availability in recent years.

With respect to its relative potential for abuse, these mitragynine-related compounds are highly likely to follow the same pattern seen with bath salts. Bath salts were created by modifying cathinones, a primary active ingredient found in a plant called khat.[ii] As soon as one of those modifications was identified and scheduled, a new cathinone-like compound was developed to evade the law. Bath salts became widely available online and at physical retail locations. "Because of their initial legal status, they were…presumed by users to be safe alternatives to other popularly abused stimulants."[iii] Rather than regulating bath salts, several states, including Ohio, and the federal government addressed this issue by banning all cathinone-like compounds (referred to as "substituted" or "synthetic" cathinones).[iv]

Similarly, mitragynine-related compounds are modified versions of kratom's primary active ingredient, mitragynine. According to the European Union Drug Agency, "[t]he chemical total syntheses reported for several kratom alkaloids are too complex to be used for economic production of any [of] these compounds. However, mitragynine can serve as a chemical precursor to the more potent 7-hydroxymitragynine."[v] 7-hydroxymitragynine (7-OH) can also be used as a chemical scaffold to make new, more potent mitragynine-related compounds. One such compound, MGM-15 (dihydro-7-hydroxy mitragynine), first described in 2014, is a highly potent semi-synthetic opioid that can be synthesized from 7-OH in a single step. In September 2025, the presence of MGM-15 was confirmed in commercially available tablets.[vi] Products containing concentrated mitragynine-related compounds (e.g., 7-OH and mitragynine pseudoindoxyl (MP)) were legally available in Ohio until rule 4729:9-1-01.1 of the Ohio Administrative Code was effective on December 12, 2025.[vii] [viii]

The European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) notes that mitragynine and 7-OH are selective and full agonists of the μ-opioid receptor.[ix] Despite a long history of use originating from Southeast Asia, the widespread commercialization of kratom and products containing mitragynine-related compounds is a recent development. As kratom commercialization has grown, so too have the number of adverse events reported to poison control centers. From January 1 to July 31, 2025, poison control centers in the United States (US) received 1,690 reports of exposure cases involving kratom, a number that already

surpasses the total for all of 2024.[x] Notably, adverse events associated with items that can be categorized as supplements are underreported. At least one source estimates the reporting rate for adverse events related to supplements to be approximately 2 percent.[xi]

7-OH and MP are approximately 10 and 100 times more potent than mitragynine, respectively.[xii] At just 10 times the potency of mitragynine, the effects and actual abuse of 7-OH prompted Food and Drug Administration (FDA) Commissioner Dr. Martin Makary to warn that it could be the next wave of the opioid crisis.[xiii] One study found that the amount of 7-OH in available products exceeded that found in naturally occurring material by up to 500%.[xiv] As with bath salts, each of the mitragynine-related compounds already available to consumers can be modified slightly to create a new drug and evade the law.

Kratom contains over 40 naturally occurring known alkaloids. One study examined the likely effects of 25 of those compounds. The study concluded that all the compounds share the most structural similarities with controlled opioid analgesics, such as morphine derivatives. Further analysis determined that 22 (including mitragynine) of the 25 compounds in kratom bind to μ-opioid receptors. The authors further noted:

> *The data from the PHASE model shows us that kratom compounds are predicted to affect the body just like opioids. Based on the scientific information in the literature and further supported by our computational modeling and the reports of its adverse effects in humans, we feel confident in calling compounds found in kratom, opioids.*[xv]

In various preclinical studies, 7-OH has demonstrated greater potency than classical opioids. For example, 7-OH produces respiratory depression with more than 3-fold greater potency than morphine. According to the FDA, since the substance's therapeutic and psychoactive effects are mediated through the same μ-opioid receptor pathways as classical opioids, it can be considered to have opioid properties warranting similar regulatory consideration.[xvi]

According to the FDA, no marketer has sought to develop a drug that includes kratom in the US.[xvii] Neither kratom nor any mitragynine-related compounds have been approved for medical use as a drug nor are they generally recognized as safe by the FDA. Kratom is illegal in 33 countries, including Malaysia, where it is found naturally.[xviii] It is also banned in several states, including Alabama, Arkansas, Indiana, Vermont, Rhode Island, Louisiana, and Wisconsin.[xix] [xx] In August, Florida emergency scheduled 7-OH.[xxi]

In Ohio, the City of Toledo embargoed kratom products with Health Commissioner Karim Baroudi, stating, "[w]hile some may believe kratom to be a harmless herbal product, its effects can be unpredictable, and its sale is not allowed under current Ohio law."[xxii] On November 5, 2025, the Toledo City Council moved to ban the sale of mitragynine-related substances and, on the same day, the state of Kentucky moved to classify 7-OH as a Schedule

I narcotic.[xxiii] [xxiv] In December 2024, the Drug Enforcement Administration (DEA) referenced 7-OH when it identified kratom as a Drug and Chemical of Concern.[xxv]

Medications approved by the FDA to treat opioid-use disorder have been used to treat individuals experiencing substance-use disorder associated with mitragynine-related compounds. For example, a case report of a male in his 40s with a history of kratom use was successfully treated with buprenorphine/naloxone, which helped alleviate his withdrawal symptoms and allowed him to abstain from kratom.[xxvi] Other case examples have been cited throughout medical literature to support the use of buprenorphine/naloxone to treat kratom-use disorder.[xxvii] [xxviii] Significantly, the term kratom-use disorder is not exclusive to mitragynine, but encompasses various kratom-derived alkaloids.[xxix]

(2) The scientific evidence of the pharmacological effect of the substance.

Regulators in both the European Union and the US have determined that mitragynine-related compounds, such as 7-OH, bind to the same receptors in the brain (μ-opioid receptors) as opioids. The European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) notes that mitragynine and 7-OH are selective and full agonists of the μ-opioid receptor.[xxx]

The FDA also found that 7-OH has high affinity and agonist activity at μ-opioid receptors. They specifically note that there is a large body of in vitro and animal studies that provide extensive evidence of 7-OH as a potent μ-opioid agonist. 7-OH produces respiratory depression, physical dependence, and withdrawal symptoms characteristic of classical opioids, such as morphine, fentanyl, oxycodone, and hydrocodone.[xxxi]

In various preclinical studies, 7-OH has demonstrated greater potency than classical opioids. For example, 7-OH produces respiratory depression with more than 3-fold greater potency than morphine. According to the FDA, since the substance's therapeutic and psychoactive effects are mediated through the same μ-opioid receptor pathways as classical opioids, it can be considered to have opioid properties warranting similar regulatory consideration.[xxxii]

A 2025 study examining respiratory depression of morphine and 7-OH found that both induced significant respiratory depression and could be reversed using naloxone. The authors conclude that 7-OH may expose individuals to similar risks as classic opioids.[xxxiii]

Case examples highlight the dangers that 7-OH and other mitragynine-related compounds pose. A 45-year-old female patient with a past medical history of asthma, attention deficit hyperactivity disorder, depression, and chronic kratom use presented to the emergency department via ambulance after being found unconscious and covered in emesis. The

woman reported ingesting a white powder labeled as kratom approximately 4 to 6 hours prior to presentation, which she had purchased from a local shop. The patient reported using a new "kratom" product that differed from what she had previously used. The authors conclude that, "given the known pharmacologic activity of 7-hydroxymitragynine and its significantly greater potency at the μ-opioid receptor compared to mitragynine, it is likely that her symptoms were primarily driven by this compound."[xxxiv]

7-OH exhibits significantly greater potency at the μ-opioid receptor, with binding affinity estimated to be approximately 10 times that of morphine.[xxxv] [xxxvi] [xxxvii] Additionally, it is metabolized to mitragynine pseudoindoxyl, a compound that also demonstrates high potency at μ-opioid receptors and contributes to the overall opioid-like effects.[xxxviii]

Medications approved by the FDA to treat opioid-use disorder have been used to treat individuals experiencing substance-use disorder associated with mitragynine-related compounds. For example, a case report of a male in his 40s with a history of kratom use was successfully treated with buprenorphine/naloxone, which helped alleviate his withdrawal symptoms and allowed him to abstain from kratom.[xxxix] Other case examples have been cited throughout medical literature to support the use of buprenorphine/naloxone to treat kratom-use disorder.[xl] [xli]

Reports from individuals on Reddit (see Appendix A) demonstrate the opioid-like properties associated with mitragynine-related products. For example:

- One user who reported taking MP for the first time described their experience as follows: "This high was nothing like I had ever experienced exceeding, but not subverting, my expectations. The headspace was mostly normal, but the body feeling was sheer bliss. Warm, glowy like I was lying on a cloud, or being hugged by a goddess, or being set on fire, if being set on fire felt good."[xlii]

- Another user reported experiences with purported 7-OH products that were "…reminiscent of some of my best oxy experiences."[xliii]

- A person warned to "treat psudo like a real opioid…" and to "keep naloxone nearby"[xliv]

(3) The state of current scientific knowledge regarding the substance.

Little to no clinical dosing research exists for any mitragynine-related compounds. No mitragynine-related compound has progressed past Phase 1 clinical trials.[xlv][xlvi] "Despite the

increasing availability of human in vitro and in vivo animal data, rigorous fundamental information about the pharmacokinetics of kratom alkaloids in humans remains limited."[xlvii]

Of the sparse pharmacokinetic research available, one study of twelve enrolled subjects monitored plasma levels of mitragynine and 7-OH as one of its metabolites, at various doses. The study found that 7-OH in plasma increased in a dose proportional manner after subjects consumed mitragynine contained in botanical kratom. The study also concluded that 7-OH steady state is reached after seven days of continuous dosing.[xlviii]

An increasing amount of 7-OH in plasma that is proportional with an individual's dose of mitragynine is important for two reasons. First, as discussed under Factor 4 below, mitragynine found in consumer products today is often several times more potent than traditional leaf products. Second, 7-OH is approximately 10 times more potent than mitragynine.[xlix] At just 10 times the potency of mitragynine, the effects and actual abuse of 7-OH prompted Food and Drug Administration (FDA) Commissioner Dr. Martin Makary to warn that it could be the next wave of the opioid crisis.[l]

Mitragynine-related compounds have not undergone randomized, placebo-controlled studies necessary to demonstrate efficacy for any condition while minimizing the significant risks associated with it.[li] "FDA has warned consumers not to use kratom because of the risk of serious adverse events, including liver toxicity, seizures, and substance use disorder (SUD). In rare cases, deaths have been associated with kratom use, as confirmed by a medical examiner or toxicology reports."[lii]

Mitragynine-related compounds are modified versions of kratom's primary active ingredient, mitragynine. According to the European Union Drug Agency, "[t]he chemical total syntheses reported for several kratom alkaloids are too complex to be used for economic production of any [of] these compounds. However, mitragynine can serve as a chemical precursor to the more potent 7-hydroxymitragynine."[liii] Clinical presentations of mitragynine-related compounds include euphoria, sedation, respiratory depression, and opioid-like withdrawal syndromes, with users acknowledging its significant addiction potential.[liv]

As stated previously, regulators in both the European Union and the US have determined that mitragynine-related compounds, such as 7-OH, bind to the same receptors in the brain (μ-opioid receptors) as opioids. The EMCDDA notes that mitragynine and 7-OH are selective and full agonists of the μ-opioid receptor.[lv] In various preclinical studies, mitragynine-related compounds have demonstrated greater potency than classical opioids. For example, 7-OH produces respiratory depression with more than 3-fold greater potency than morphine.[lvi]

(4) The history and current pattern of abuse.

It is not unusual for preparations of mitragynine-related compounds in the US to differ significantly from traditional kratom preparations. Where isolates and extracts are widely available in the US, kratom was traditionally made from boiling fresh leaves. The impacts are notable as increased demand, including for 7-OH and MP products, has coincided with a wide variety of product preparations such as gummies, organic extracts, vapes, liquid shots, and tablets. In fact, websites stress the ease of consuming semi-synthetic products over kratom.[lvii]

Even products sold as vegetation and those labeled as ground vegetation have been found to contain several times the amount of mitragynine than actual kratom leaf material. [lviii] Indeed, manufacturers of products marketed as "all-natural and unadulterated" acknowledge that extracts are several times greater than the plant from which they start (see Figure 1).[lix] Postmortem toxicology findings from patients who used kratom had concentrations "higher than those reported in Thai individuals consuming traditional kratom tea without adverse effects."[lx]

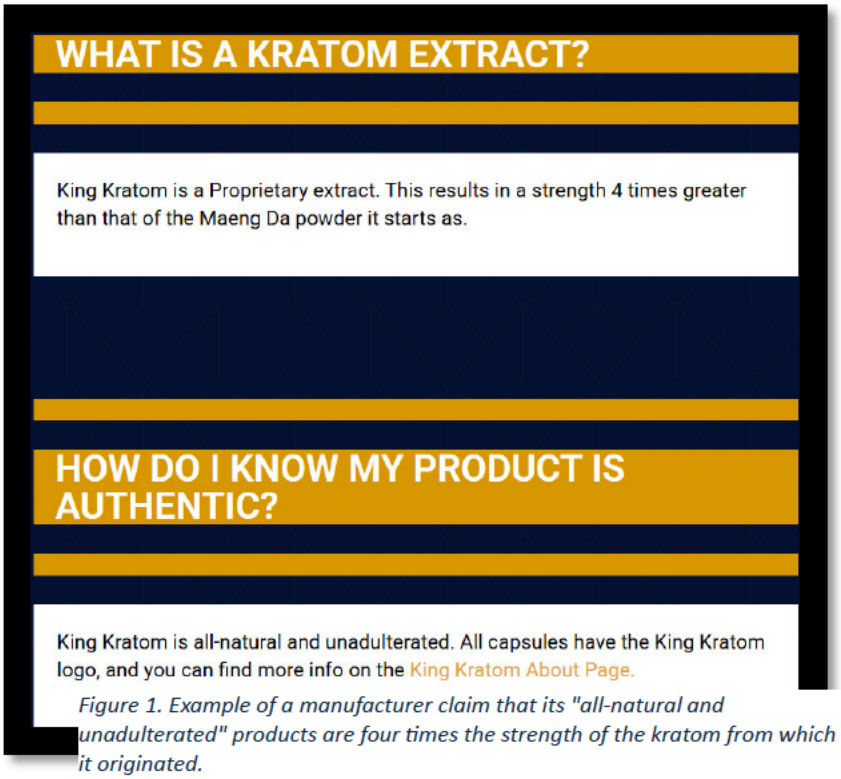


Figure 1. Example of a manufacturer claim that its "all-natural and unadulterated" products are four times the strength of the kratom from which it originated.

A recent review of available mitragynine-related products found websites and/or packaging marketed to consumers with unsubstantiated health claims. Most (73.4%) of products made what we considered to be general well-being claims, the most common being increased focus (58.2%), provides relaxation (46.7%), or boosts energy (39.5%). Products sold as 7-OH had a greater proportion of effect claims (76.8%) than MP (50.0%) or combination products (59.1%) with one vendor telling customers they might expect: "Enhanced Relaxation, Focus, Energy Motivation, Mood Elevation, Body Buzz, Euphoria, Discomfort Suppression, Apprehension Relief, Feeling Present, Stimulation, Arousal, Social Lubrication."[lxi]

Additionally, some of these products are branded to imply they provide the same relief as FDA-approved prescription medications. For example, the brand names included terms such as "7rx," "Curevana," "Generic RX," "Pain Crusher Rx." Many products were packaged in ways that mimicked FDA-approved medications (e.g., cough syrup, blister packs). Further, some vendors are making drug claims about mitragynine-related products. For example, an MP tablet included the following description for consumers:

> *"Pseudoindoxyl, the active compound in these tablets, is known for its potent analgesic properties, making it an excellent choice for those dealing with chronic pain or discomfort. It works by interacting with the body's opioid receptors, providing significant relief without the typical side effects associated with traditional opioids."*[lxii]

The Ohio Substance Abuse Monitoring (OSAM) Network report from January 2025 found kratom use associated with opioid use, as the substance reportedly has similar effects, and kratom is reportedly advertised to help mitigate opioid withdrawal symptoms and stop opioid use. They stated: *"[a]dvertisements for kratom* [are] *on Facebook … advertised as a way to get off of opiates, certain kinds of opiates;* [Kratom] *has similar withdrawal* [symptoms as heroin]*; Kratom mimics the effects of heroin … but the POs (parole officers) are aware of it now."*[lxiii]

On July 29, 2025, Commissioner Makary sent a letter to healthcare professionals stating that "7-OH products have exploded in popularity in recent years, with vape shops, gas stations and corner stores selling pills, gummies, candies, and even eye-catching products like ice cream cones containing 7-OH." Makary goes on to say, "increases in adverse events and related reports to poison control" raises concern "about the growth of 7-OH product sales nationwide."[lxiv] Several examples of widely available products intended to look like everyday treats provided by the FDA contain multiple mitragynine-related compounds (see Figure 2).[lxv]

Figure 2. Examples Provided by the FDA of Commercial Products Containing Mitragynine-Related Compounds

US Poison Control Centers report multiple cases of 7-OH exposure resulting in serious adverse outcomes this year. However, the number of adverse events related to 7-OH and other mitragynine-related compounds is most likely underreported due to a lack of self-reporting among individuals and the fact that the National Poison Data System codes for reporting cases of 7-OH exposure were only added earlier this year.[lxvi]

Nationally, the FDA notes that the number of fatal overdose cases reported by the Drug Enforcement Administration Toxicology Testing program in which one or more of these substances were detected for 2023 to 2025 are approximately three-fold higher than for the years 2019 through 2022, coinciding with the more recent entry of mitragynine-related products in the marketplace, such as 7-OH and MP.[lxvii]

(5) The scope, duration, and significance of abuse.

The National Drug Early Warning System (NDEWS) conducts real-time national surveillance to detect emerging drug trends. NDEWS methods include both novel methods like street reporting and web monitoring as well as traditional data sources like overdose deaths and treatment admissions. According to NDEWS, Reddit users report the following regarding mitragynine-related compounds:

> *Users describe withdrawal symptoms from concentrated alkaloid products as more severe than traditional kratom leaf, with some comparing them to pharmaceutical opioid withdrawal. Limited awareness exists about the pharmacological differences between traditional kratom and these novel derivatives, leading to unexpected overdose-like symptoms including respiratory depression concerns.*[lxviii]

The Ohio Substance Abuse Monitoring (OSAM) Network report from January 2025 found kratom use associated with opioid use, as the substance reportedly has similar effects, and kratom is reportedly advertised to help mitigate opioid withdrawal symptoms and stop opioid use. They stated: *"[a]dvertisements for kratom* [are] *on Facebook … advertised as a way to get off of opiates, certain kinds of opiates;* [Kratom] *has similar withdrawal* [symptoms as heroin]*; Kratom mimics the effects of heroin … but the POs (parole officers) are aware of it now."*[lxix]

A treatment provider in the Cleveland region spoke about the promoted health benefits of kratom, saying, *"[y]ou can go to the store and buy* [kratom] *now … because people look up positive things about it (health benefits). It's a pain reliever … it does give the effect of opiates*

or heroin…. If someone has a little pain and they think it's healthy and natural [then they may try it]…."[lxx]

Reportedly, kratom is desirable because its alkaloids are not always included on drug screens. Treatment providers observed: *"Kratom is still one of those things that's out there that's being abused, that's not being caught* [through drug screening]*; I spoke to our nurse practitioner, and in small doses* [kratom] *doesn't show up on the* [drug] *screen. It's because people are taking way high doses that are detectable* [on drug screens] *that are not good for you, you know, addiction wise; A lot of places don't test for it* [on drug screens]*. So, until we started testing for it, I didn't hear that much about it, but now our lab tests routinely include kratom."*[lxxi]

Internationally, the United Nations reports that the "United States and Australia have reported toxicology cases with high concentration 7-OH products being involved to the UNODC Early Warning Advisory (EWA) on New Psychoactive Substances Tox-Portal." [lxxii] 7-hydroxymitragynine and mitragynine pseudoindoxyl are currently not controlled under the UN conventions, which are intended to establish an international legal framework for drug control.[lxxiii]

While mitragynine-related compounds are sold in vape shops, gas stations, and other brick and mortar retailers, there is a growing market for these products on the dark web. These compounds are sometimes offered with other controlled substances such as suboxone, Adderall, and psilocybin. Customers on the dark web also warn of the use of 7-OH products, specifically stating, "This is big boy stuff more akin to oxycodone or Vicodin (which I don't mind)."[lxxiv]

(6) The risk to the public health.

In Ohio, a growing number of deaths associated with kratom – which contains the main active constituents mitragynine and 7-hydroxymitragynine – have been reported, indicating that these compounds are a risk to public health. From 2019 to 2024, the Ohio Department of Health reported at least 202 deaths in which kratom is listed as a cause of death (see Figure 2).

Figure 2. Number of Unintentional Drug Overdose Deaths Involving Kratom (Mitragynine), 2019 - 2024[lxxv]							
Year	Total No. of Overdose Deaths	No. of Deaths with Kratom Detected in Postmortem Toxicology	% of Total Overdose Deaths with Kratom Detected in Postmortem Toxicology	No. of Deaths with Kratom Listed as a Cause of Death	% of Deaths with Kratom Detected in Postmortem Toxicology where Kratom Was Listed as a Cause of Death	No. of Deaths with Kratom Detected in Postmortem Toxicology That Were Also Positive for Other Substances	% of Deaths with Kratom Detected in Postmortem Toxicology That Were Also Positive for Other Substances
2019	3,962	19	0.5%	15	78.9%	17	89.5%
2020	4,943	34	0.7%	29	85.3%	29	85.3%
2021	5,174	49	0.9%	37	75.5%	41	83.7%
2022	4,916	47	1.0%	40	85.1%	44	93.6%
2023	4,461	52	1.2%	37	71.2%	43	82.7%
2024*	3,015	54	1.8%	44	81.5%	43	79.6%
Total	**26,471**	**255**	**0.9%**	**202**	**79.2%**	**217**	**85.1%**

**Data for 2024 is not yet complete.*

Several forensic cases of opioid-like deaths with lung congestion and high postmortem mitragynine blood concentrations with no obvious alternative causes of death have now been reported.[lxxvi] [lxxvii] There is also a report of naloxone being successfully used to reverse kratom intoxication.[lxxviii] This evidence suggests that high enough doses of kratom alkaloids may cause opioid toxicity via the usual opioid-receptor pathways implicated in conventional opioid overdoses.[lxxix] A recent news release from the Los Angeles County Department of Public Health reported three fatal overdoses involving high doses of 7-hydroxymitragynine and alcohol to persons who were "otherwise healthy, with no other substances identified as substantively contributing to their deaths."[lxxx]

The example from Los Angeles County reinforces the dangers of respiratory depression with 7-OH. A 2025 study examining respiratory depression of morphine and 7-OH found that both induced significant respiratory depression and could be reversed using naloxone. The authors conclude that 7-OH may expose individuals to similar risks as classic opioids.[lxxxi]

After Utah developed a regulatory scheme to maintain over-the-counter access to kratom, overdose deaths related to kratom and treatment for kratom use disorder persisted. One emergency room physician reported patients sharing that they "had no idea it was just like a narcotic," and that his patients experience the same withdrawal symptoms as those withdrawing from narcotics.[lxxxii] The Utah State Medical Examiner reported nearly 160 kratom-related deaths over a five-year period. While most of those overdoses involved polysubstance use, the state saw almost 50% as many kratom-only deaths in the most recent 12-month reporting period as Utah had seen since 2014.[lxxxiii] Consequently, the Utah legislature

proposed to add all alkaloids from kratom and their analogs to the state's list of controlled substances in November 2025. The bill sponsor originally voted to regulate kratom in 2019 but now "sees kratom in all forms as a dangerous opioid masquerading as a supplement."[lxxxiv]

There are also documented cases of kratom use by expecting mothers resulting in neonatal abstinence syndrome for newborns.[lxxxv] [lxxxvi] [lxxxvii] [lxxxviii] These cases are particularly concerning given that the promotion of kratom products as safe alternatives to opioids may well persuade expecting mothers to consume kratom products to avoid the adverse impacts of opioids on their unborn child. The concern is compounded by the previously discussed tendency of consumers to believe that the legal status of a substance means that it is a safe alternative to a controlled substance.

Evidence supports the position that the ingredients in mitragynine-related products available to consumers are void of robust quality control. Mitragynine-related products appear to follow the same pattern as popular natural alternatives and/or "legal highs" to controlled substances that came before it. In one study, products clearly labeled as containing the single alkaloid 7-OH all "contained at least detectable amounts of mitragynine and mitragynine pseudoindoxyl, as well as some other Kratom alkaloids."[lxxxix]

Without the permanent scheduling of mitragynine-related compounds, these products will be widely available for purchase by adolescents upon the expiration of emergency rule 4729:9-1-01.1 of the Ohio Administrative Code. This is concerning given recent findings demonstrating that "adolescent kratom exposure particularly mitragynine and LKD [lyophilised kratom decoction] may cause selective cognitive and behavioural deficits. The brain metabolite profiles further suggest that the altered metabolic pathway (i.e., arachidonic acid, pantothenate and CoA, and tryptophan) may underlie the kratom-induced cognitive and behavioural deficits. Together, these findings demonstrate that adolescents' brain is sensitive to the impact of early kratom exposure during this critical development period."[xc]

One study found widespread online marketing of mitragynine-related product ingredients which, as discussed previously, have high binding affinity to the μ-opioid receptor. The authors note: "7-OH was listed as the most common constituent of these commercial products. The difficulty and expense of isolating 7-OH from kratom leaves, but also the sheer amount of active 7-OH ingredient, strongly suggests that these semi-synthetic products are manufactured in a laboratory from purified mitragynine. The chemical processes used to make 7-OH also likely places consumers at risk for inadvertent exposure to toxicity from synthetic reagents and reaction by-products."[xci]

Anecdotal reports submitted to the Board highlight the dangers that kratom-related products pose to public health:

- *I am writing to urge the Board to finalize the proposed classification of 7-hydroxymitragynine (7-OH) and other kratom compounds as Schedule I controlled substances. I have personally witnessed the devastating effects of 7-OH. My husband has struggled with a severe addiction, enduring constant withdrawal symptoms and repeated relapses. The substance's easy availability in stores and online has made it nearly impossible for him to fully recover, and I have seen how accessible it puts others at risk.*[xcii]

- *Hello, I am a married wife of a kratom addict. I married my husband 7 years ago after he was clean off drugs (pills, cocaine, weed) for 8 years. He relapsed after 4 years into our marriage and has been addicted to kratom since. He was offered a sample by a gas station attendant … stated "are you looking for energy, try this". Since then he takes up to 60 capsules a day lost 25 pounds and is in a constant state of irritability, speedy, highs, and super lows withdrawling ect. He tried detox once and relapse 2 days later. He says it's so hard to quit bc it's so easy to get and cheap. This garbage is horrible and I cannot believe kids can get a hold of this junk. I am pleading for your office to understand the severity of this "supplement". My soon to be ex-husband has now transitioned to the "7oh tabs" that are more potent and also easy to get apparently sold at smoke shops and cbd stores. I know it is the choice of the individual to pick up a substance and it's their responsibility to quit, but I worry about my kids (16 and 5) in their future if they stumble upon this gas station heroine. To whatever it's worth I just wanted to share my story.*[xciii]

- *I'm not sure who will be reading this email or if it will really even matter but I urge you to please ban kratom and 7hydroxymitragynine. My fiancé has been addicted to this stuff almost an exact year to the day and it has torn my family apart. He has gone into close to 30k of credit card debt trying to keep up with this habit and it has cause a lot of mental distress. I know he has to take responsibility for his use and action but the first time he took a pill it was given to him FOR FREE as a sample from the clerk at the corner store. It was given to him as a "natural herbal supplement" to boost energy and help with anxiety. What was left out was that is stuff is essentially legal heroine. I am praying everyday for this to be banned and maybe when it is he will be able to actually stay sober for more than a few days at a time. This is an evil product and should 100% be taken off the shelves and made illegal.*[xciv]

(7) The potential of the substance to produce psychic or physiological dependence liability.

A review of several studies conducted by the FDA found that mitragynine-related compounds such as 7-OH have a "high-affinity for opioid receptors and functional activity as an agonist at these receptors." FDA further explains:

> *Consistent with this pharmacological activity, 7-OH is self-administered by animals, substitutes for morphine in drug discrimination studies, produces antinociception, and physical dependence leading to withdrawal when administered to rodents. Moreover, 7-OH has consistently demonstrated an increased potency relative to morphine in preclinical rodent studies. These observations suggest 7-OH has pharmacological properties representative of a full mu opioid agonist and an associated high potential for abuse.*[xcv]

An analysis of 329 posts to Reddit online forums for kratom use between 2020 and 2022 revealed common themes of problematic use of kratom extracts leading to use disorder development and withdrawal.[xcvi] [xcvii] Furthermore, limited pre-clinical data suggest that 7-hydroxymitragynine likely confers greater misuse potential than mitragynine, again indicating that new, more concentrated products with higher alkaloid amounts or isolated, highly potent alkaloids may have enhanced risks to public health.[xcviii]

The National Drug Early Warning System (NDEWS) conducts real-time national surveillance to detect emerging drug trends. NDEWS methods include both novel methods like street reporting and web monitoring as well as traditional data sources like overdose deaths and treatment admissions. According to NDEWS, Reddit users report the following regarding mitragynine-related compounds:

> *Users describe withdrawal symptoms from concentrated alkaloid products as more severe than traditional kratom leaf, with some comparing them to pharmaceutical opioid withdrawal. Limited awareness exists about the pharmacological differences between traditional kratom and these novel derivatives, leading to unexpected overdose-like symptoms including respiratory depression concerns.*[xcix]

Product labeling for mitragynine-related compounds also include statements acknowledging the ability of these compounds to produce psychic or physiological dependence including:

- Avoid if you have a history of substance abuse.
- This product may be highly addictive.

- This product contains kratom. Kratom may be addictive. Product not intended for daily use.
- Regular use can lead to physical and/or psychological dependence, addiction, and withdrawal symptoms may occur upon discontinuation.
- Do not take if you have any health condition or are taking a prescription medication or use opiates or other illicit drugs. Kratom and its derivatives can lead to addiction. Do not take this product if you are or have been addicted to any substance illicit or legal as you may become addicted or experience a serious adverse event as kratom and its derivatives are linked to minor and serious side effects including addiction, nausea, aggression, hallucinations, trouble breathing, withdrawals, and ***death*** *[emphasis added].*
- Do not take more than 2 per day for 3 consecutive days. Exceeding this dose may lead to addiction and other deleterious effects.[c]

Lastly, products containing mitragynine-related compounds are being marketed in formulations that resemble other commonly misused controlled substances. For example, manufacturers are producing 7-OH products in "bars," which is common slang for Xanax—a benzodiazepine and a controlled substance (see Figure 3).[ci]

Figure 3. Dopium Bars Containing 7-OH and an Image of Xanax (sometimes referred to as Xanny Bars)[cii] [ciii]

(8) Whether the substance is an immediate precursor.

7-OH is a precursor to other mitragynine-related compounds.[civ] These include mitragynine pseudoindoxyl and MGM-15 (dihydro-7-hydroxy mitragynine). Mitragynine-related compounds are temporarily classified as schedule I controlled substances under rule 4729:9-1-01.1 of the Ohio Administrative Code.[cv]

As previously discussed, mitragynine-related compounds are highly likely to follow the same pattern seen with other drug classes like bath salts. Bath salts were created by modifying cathinones, a primary active ingredient found in a plant called khat.[cvi] As soon as one of those modifications was identified and scheduled, a new cathinone-like compound was developed to evade the law.

Looking to past illicit drug patterns, unexpected ways to synthesize mitragynine-related compounds may be established—as at least one has already been identified. As a result, potent, never-before-seen substances are likely to be created.

One unexpected synthetic pathway to create new opioids is already identified. MGM-15 is not naturally occurring and can be synthesized from 7-OH in a single step. It has significantly enhanced μ-opioid receptor activity and was first described in 2014. In September 2025, the presence of MGM-15 was confirmed in commercially available tablets.[cvii]

Scheduling mitragynine-related compounds like 7-OH in isolation will leave the same loopholes in Ohio's chemical control efforts as scheduling individual cathinones. If there is a lapse in rule 4729:9-1-01.1 of the Ohio Administrative Code or if 7-OH is scheduled in isolation, potent opioids will remain legally available over the counter.

Section 4: Finding of the Board

Pursuant to section 3719.44 the Board may add or transfer a compound, mixture, preparation, or substance to Schedule I when it appears that there is a high potential for abuse, that it has no accepted medical use in treatment in this state, or that it lacks accepted safety for use in treatment under medical supervision.

After a review of all available data, the Board finds mitragynine-related compounds have a high potential for abuse, have no accepted medical use in treatment in this state, and that they lack accepted safety for use in treatment under medical supervision.

Section 5: Resolution of the Board

Based on these findings, the Board hereby authorizes the filing of rule 4729:9-1-01.1 of the Administrative Code with the Common Sense Initiative and the Joint Committee on Agency Rule Review to classify as a schedule I opiate or opiate derivative any material, compound, mixture, or preparation that contains mitragynine-related compounds.

Section 6: Proposed Rule

4729:9-1-01.1 – Mitragynine-Related Compounds (NEW)

The following are classified as schedule I controlled substances:

(A) Mitragynine-related compounds, whether synthetic or naturally occurring substances contained in the plant, or in the resinous extractives of mitragyna speciosa (also known as kratom) and/or synthetic substances, derivatives, prodrugs, isomers, esters, ethers, salts and salts of isomers, esters and ethers with similar chemical structure.

Mitragynine-related compounds include, but are not limited to, the following: 7-hydroxymitragynine; mitragynine pseudoindoxyl; dihydro-7-hydroxy mitragynine; and 7-acetoxymitragynine. Mitragynine-related compounds do not include any of the following:

(1) Any dangerous drug that is the subject of an application approved by the United States food and drug administration under subsections 505(c) or (j) of the Federal Food, Drug, and Cosmetic Act (21 U.S.C. 355(c) or (j)) (December 12, 2025) for marketing as a dangerous drug;

(2) Any compound used in food consistent with either:

(a) A food additive regulation published in the United States code of federal regulations; or

(b) A “no questions response” issued by the United States food and drug administration in response to a generally recognized as safe notice.

(3) Any drug approved by the United States food and drug administration that may be lawfully sold over the counter without a prescription in accordance with section 505G of the Federal Food, Drug, and Cosmetic Act (21 U.S.C. 355h) (December 12, 2025).

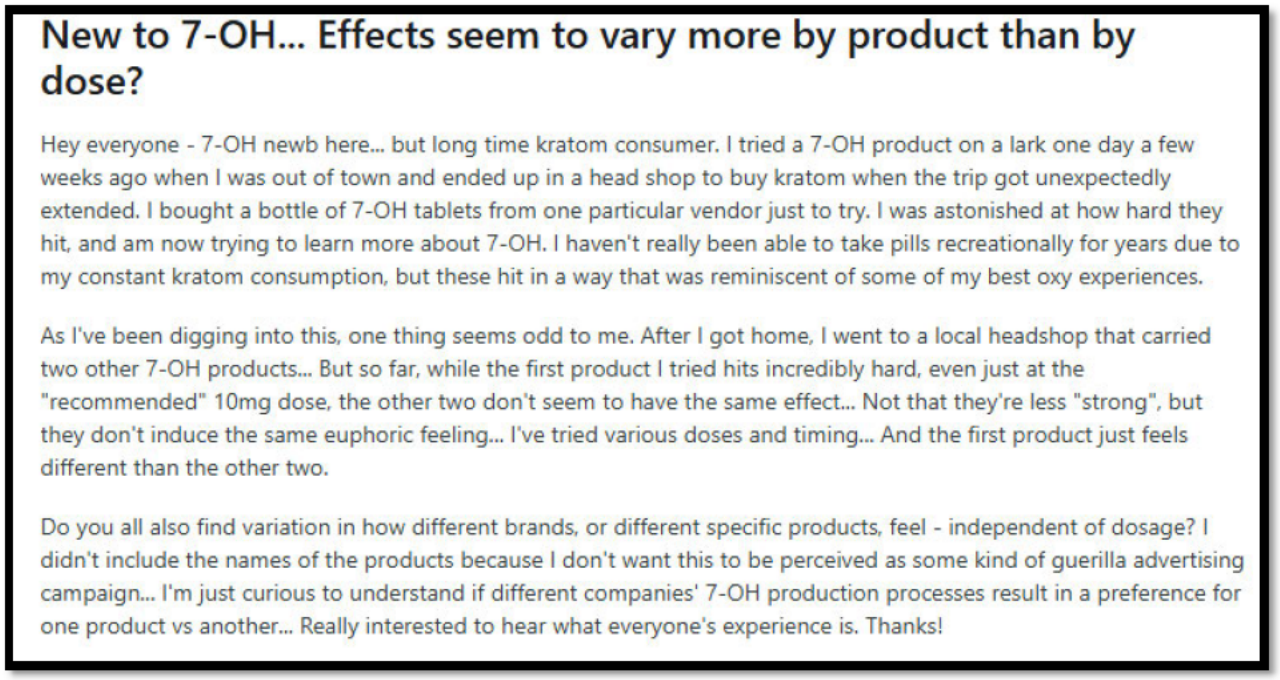
(4) Kratom in its natural vegetation form and in accordance with Chapter 3715. of the Revised Code.

Appendix A - Reddit Comments

Tried Pseudoindoxyl for the first time yesterday.

Experience

I have never tried traditional opioids or kratom products before, but with all the news stories going around, talks of a potential ban definitely piqued my curiosity. Amphetamines, opioids, synthetic cathinones all nothing compared to the strongest dependence of them all FOMO. So, I decided to do some shopping. Next, the question: which compound should I go with 7-OH or PSEUDO? Heard they are pretty similar so I decided to just go with whichever one I could find the best deal on, on the least shady of websites. Eventually, after some searching, I picked up some Heat Pseudo 80mg Bomb Pop flavored tablets. I've seen some mixed things on this subreddit about the brand Heat consensus seems to be they are underdosed, anywhere from 70mg to 35mg. While this was definitely a con the pro of Bomb Pop flavoring won out. After about a week of waiting, they finally arrived. I had to wait a little longer to find a good day to do them, but I finally got that chance yesterday. I decided to drop one of the tablets. This is how it went: They had around a 30 minute onset to where I could first feel the effects, and about another 30 minutes to peak effect. This high was nothing like I had ever experienced exceeding, but not subverting, my expectations. The headspace was mostly normal, but the body feeling was sheer bliss. Warm, glowy like I was lying on a cloud, or being hugged by a goddess, or being set on fire, if being set on fire felt good. Though there was some slight itching and nausea it was very manageable. This peak lasted around 3 hours, with the comedown lasting around 4 more. This overall was a really positive experience. If it's not banned (which I see no reason why law makers should feel compelled to end the era of obtaining opioids without the risk of adulteration.), I could see considering price, tolerance, and risk of addiction this being a nice 1-2 times a month treat and an alternative to shake up the monotony of the THC edible I usually take when I want to relax.



New to 7-OH... Effects seem to vary more by product than by dose?

Hey everyone - 7-OH newb here... but long time kratom consumer. I tried a 7-OH product on a lark one day a few weeks ago when I was out of town and ended up in a head shop to buy kratom when the trip got unexpectedly extended. I bought a bottle of 7-OH tablets from one particular vendor just to try. I was astonished at how hard they hit, and am now trying to learn more about 7-OH. I haven't really been able to take pills recreationally for years due to my constant kratom consumption, but these hit in a way that was reminiscent of some of my best oxy experiences.

As I've been digging into this, one thing seems odd to me. After I got home, I went to a local headshop that carried two other 7-OH products... But so far, while the first product I tried hits incredibly hard, even just at the "recommended" 10mg dose, the other two don't seem to have the same effect... Not that they're less "strong", but they don't induce the same euphoric feeling... I've tried various doses and timing... And the first product just feels different than the other two.

Do you all also find variation in how different brands, or different specific products, feel - independent of dosage? I didn't include the names of the products because I don't want this to be perceived as some kind of guerilla advertising campaign... I'm just curious to understand if different companies' 7-OH production processes result in a preference for one product vs another... Really interested to hear what everyone's experience is. Thanks!

Key-Boat-7519 • 3mo ago

Treat pseudo like a real opioid: space your sessions wide, don't mix with booze/benzos/gabapentinoids, and keep naloxone on hand.

Glad OP had a clean ride, but tolerance sneaks up fast. What helped me: split tabs (even quarters) and wait a full 2–3 hours before considering more; take with a light snack to blunt nausea; ginger or peppermint tea for the stomach; a non-drowsy antihistamine for itch (avoid sedating ones). Watch constipation from day one-fiber, water, magnesium citrate, and a softener if needed. Skip grapefruit or cimetidine since they can unexpectedly spike effects. If using THC, keep it low; stacking can turn the comedown muddy and amplify nausea. I treat it as a once or twice a month thing and set a hard cooldown on my calendar so "just one more" doesn't creep in.

I keep Narcan from NEXT Distro, use DanceSafe test strips when I'm unsure about tabs, and 7ohmz to log dose, spacing, and side effects.

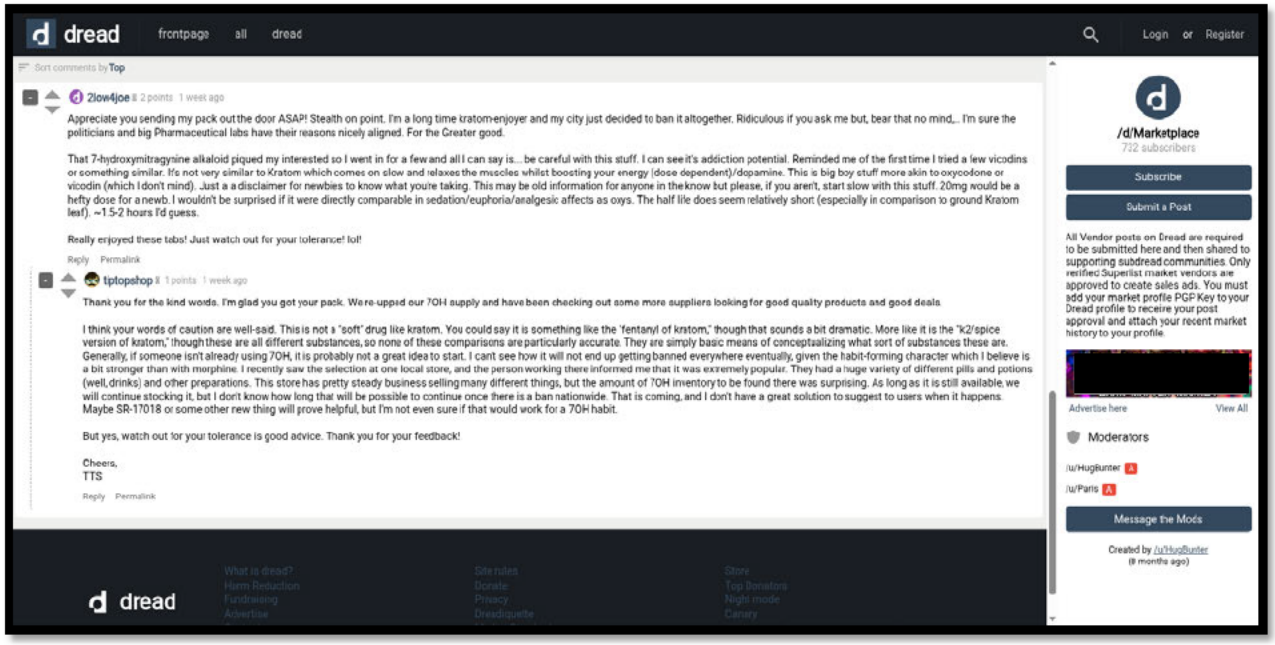
Bottom line: wide spacing, no depressant combos, and naloxone nearby.

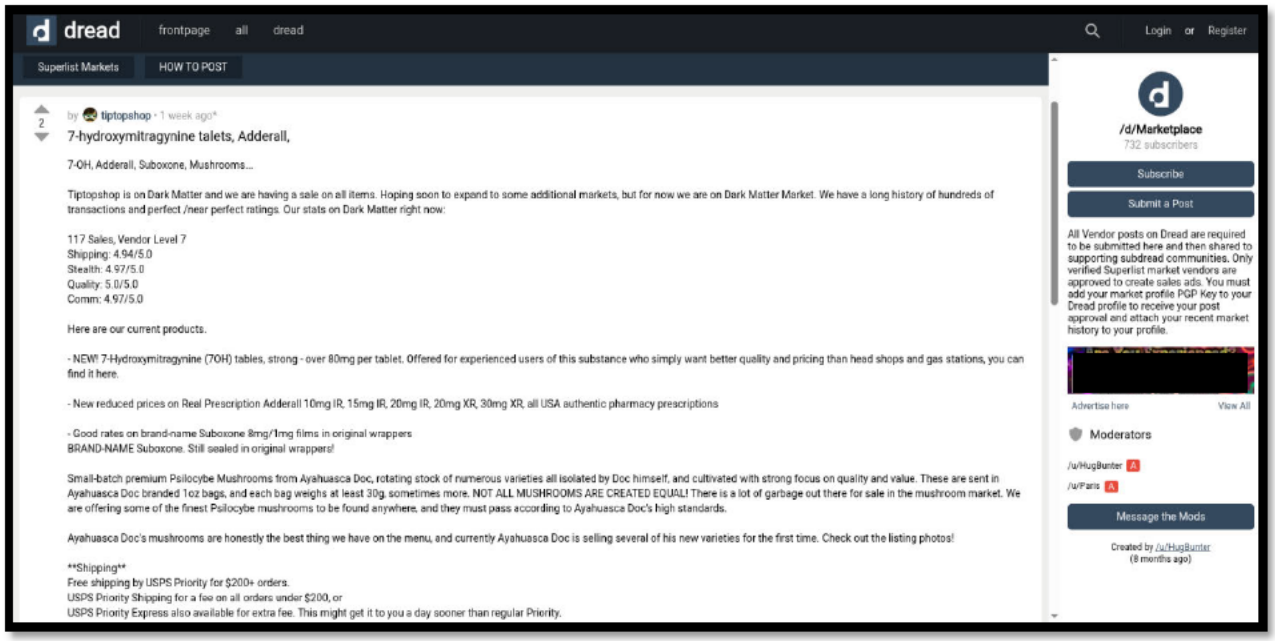
Educational Post: Beware Pseudoindoxyl

Acute Withdrawals

Listen to me everyone, please. Pseudo is a loophole in the system, so all of you guys who just had 7oh banned in your state, they will start selling pseudo saying it's "compliant" with the ban. It is the same, if not worse, to get off of. It happened to me in Georgia. January of 2025 7oh got banned in GA, after I had just found it in November. I should have taken that as a sign and moved on but no I went looking for something similar a few months later and I found it. Tablets that are exclusively pseudo. Now, here I am, 16 days off of pseudo feeling like I finally kicked it. Do not do it because they will find the loophole and start selling it. Florida, Kentucky, wherever.

Appendix B – Dark Web Posts



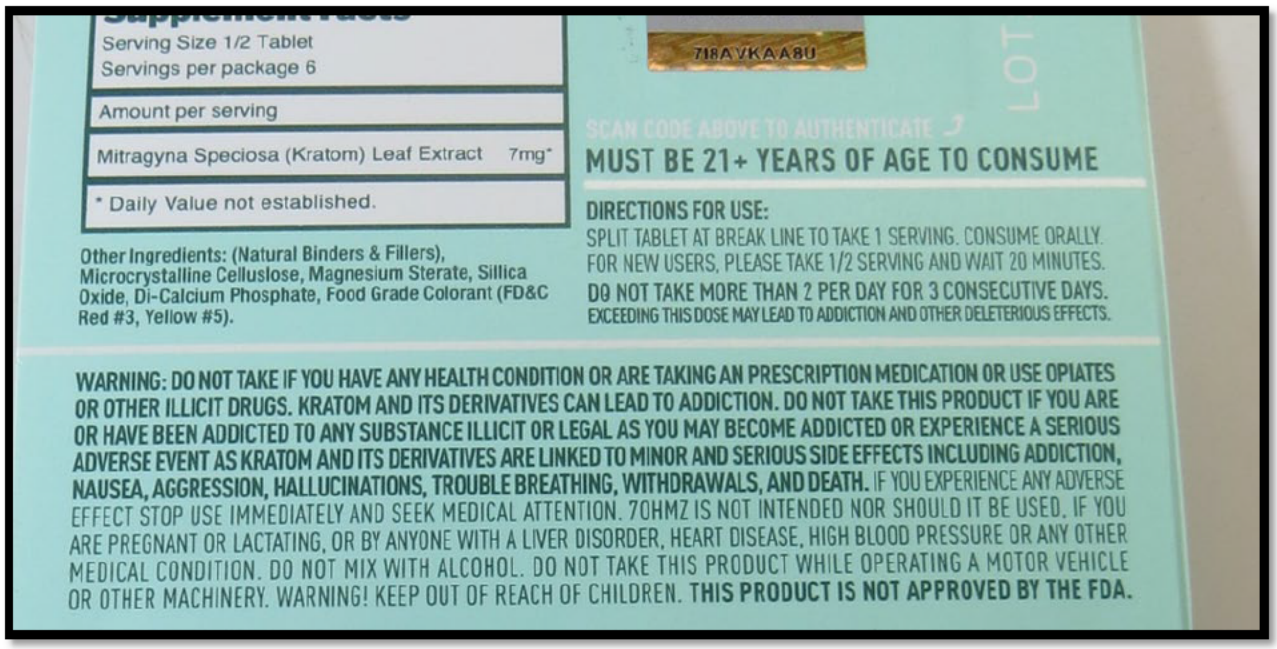


Appendix C – Product Labels & Examples

Source: *https://pureleafkratom.com/products/opia-7-oh-chewable-tablets-blue-raspberry-30mg-per-tablet.html* ***(Last Accessed Jan. 3, 2026)***

Source: *https://pureleafkratom.com/products/dopium-7-hydroxymitragynine-chewable-tablets-tiger-s-blood-50mg-per-tablet.html* ***(Last Accessed Jan. 3, 2026)***

Source: United States Food and Drug Administration. 7-Hydroxymitragynine (7-OH) Products. https://www.flickr.com/photos/fdaphotos/albums/72177720327395989/ (Last Accessed Jan. 3, 2026)



Source: United States Food and Drug Administration. 7-Hydroxymitragynine (7-OH) Products. https://www.flickr.com/photos/fdaphotos/albums/72177720327395989/ (Last Accessed Jan. 3, 2026)

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