Emerging Substance Profile

Kratom, Mitragynine, & 7-Hydroxymitragynine (7-OH)

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This brief provides an overview of Kratom, mitragynine, 7-OH, and related products and their effects.

What is Kratom?

Kratom is a tree native to Southeast Asia. Its leaves can cause stimulant effects when consumed in low doses and sedative effects when consumed in high doses (DEA, 2020). Kratom leaves contain more than 50 alkaloids, with two primary psychoactive compounds: **mitragynine** and **7-hydroxymitragynine (7-OH)** (Warner et al., 2016). Kratom has a long history of use throughout Southeast Asia both medicinally and recreationally. Its recreational use within the United States has surged in recent years due to its increasing availability at gas stations or vape shops with few or no age restrictions and promotion as a potential treatment for conditions such as chronic pain, headaches, diarrhea, insomnia, anxiety, alcoholism, and opioid use disorder (FDA, 2025a).

Kratom products have been the center of regulatory discussions since their rise in popularity in the mid-2000s. In July 2025 the Food and Drug Administration (FDA) recommended scheduling 7-OH products under the Controlled Substances Act (FDA, 2025b). As of August 2025, Washington DC and 6 states (Alabama, Arkansas, Indiana, Louisiana, Vermont, and Wisconsin) banned kratom products entirely. Ohio Governor Mike DeWine has recommended that the Ohio Board of Pharmacy classify all kratom compounds as Schedule I drugs (Governor of Ohio, 2025).

Kratom Leaf and its Effects:

Kratom is available in the forms of fresh leaves for chewing or as processed powders and extracts to consume in tea, via capsules/tablets or added to food and drinks (Mayo Clinic, 2024). Kratom products in the U.S. are often marketed and sold in “red,” “green,” and “white” strains, based on the leaf-vein coloring and region from which the plant was harvested (e.g., red Malay, white Thai, green Thai), although these distinctions appear not to be recognized largely in Southeast Asia (Huisman et al., 2023). Online vendors claim that differing kratom strains are associated with different effects.

Kratom leaves
(Image Credit: Wikipedia Commons [CC BY-SA 4.0])

For example, many vendors report that red strains have the most sedative effects, white strains provide high energy, and green strains fall somewhere between the two (Huisman et al., 2023). Some studies have found that there may be some chemical variations of alkaloid content between the strains, while a recent clinical study found that none of these variations in alkaloid content were significant enough to explain different effects (Kamble et al., 2020; Huisman et al., 2023).

Mitragynine

Mitragynine is the major constituent present in the kratom plant, comprising about two-thirds of the total alkaloid content (World Health Organization, 2021). Mitragynine also is kratom's main psychoactive compound, which is associated with kratom's pain-relieving and euphoria-inducing effects. Mitragynine is not an opioid in its chemical structure, but data demonstrates that it has the ability to bind to the opioid mu-receptor and trigger opioid-like effects.

Tablets, gummies, drinks, or drink-mix products containing mitragynine may be labeled as "kratom extracts," "plant alkaloids," or "alkaloids." Kratom and kratom-related mitragynine products are not approved by the FDA for sale as a drug product, dietary supplement, or food additive (FDA, 2025a).

7-Hydroxymitragynine (7-OH)

7-OH is an alkaloid naturally present within the kratom plant, but as a minor constituent often comprising less than 2% of the total alkaloid content (FDA, 2025d). 7-OH products emerged in 2023. The enhanced presence of 7-OH in many semi-synthetic commercial kratom products far surpasses the small amount that is found within kratom leaves. 7-OH has a potency that can be as much as five to 50 times greater than unenhanced kratom powders (Hastings, 2025).

Early in vitro and animal studies have suggested that 7-OH binds to and activates the opioid mu-receptor, causing opioid-like effects of pain relief and euphoria. 7-OH is far more potent than mitragynine in its opioid receptor stimulation (Anderer, 2025). To date no clinical studies appear available of the effects of 7-OH alone. The FDA warns that 7-OH poses risks for respiratory depression, physical dependence, withdrawal effects, and a potency similar to morphine (FDA, 2025c).

7-OH products can come in several forms (e.g., tablets, gummies, drink mixes, and shots) and are available online and at smoke shops, gas stations, and convenience stores. The products may be marketed as a treatment for conditions such as anxiety, mood disorders, chronic pain, and opioid withdrawal; however, they have not been approved by the FDA as a safe or effective treatment for these or any other uses (FDA, 2025c).

Enhanced Mitragynine and 7-OH Example Products

Food and Drug Administration

Is Kratom an Opioid?

Kratom products are not opioids in chemical structure but mitragynine and 7-OH can trigger opium-like effects (Takayama et al., 2002; Karunakaran et al., 2022). Kratom products have been advertised as a self-prescribed treatment for chronic opioid use, yet kratom products have not been clinically proven or approved for use as such a treatment.

While kratom alkaloids have been detected in some decedent toxicologies across the U.S. in recent years, the cause of death was often ascribed to the co-occurring presence of substances such as fentanyl, heroin, benzodiazepines, prescription opioids, and cocaine (Henningfield et al., 2019). Initial studies of mitragynine have noted that it does not carry a similar level of lethal risk as opioids (Henningfield et al., 2019). Further research regarding the risks of 7-OH are required.

While kratom-related overdose appears to be rare, it is possible; further research is required in terms of responding to kratom-related overdoses, but naloxone (Narcan) use for overdose reversal has been reported as effective in an emergency medicine case study (Overbeek et al., 2019). Naloxone administration is recommended additionally to reverse overdose in case of intentional or unintentional ingestion of other opioids alongside kratom products.

FDA approved medication-assisted treatments for opioid use disorder are available. If you or others are seeking treatment for opioid use disorder, resources and information can be found here.

Kratom Impacts in Cuyahoga County

To date the Cuyahoga County Medical Examiner's Office has detected the presence of mitragynine in 23 decedent toxicologies.[1] However, it is important to note that the involvement of the substance cannot determine whether or not the death was directly caused by the compound, especially as most cases show co-occurrence with other substances such as fentanyl analogues, cocaine, heroin, and carfentanil. No deaths involving 7-OH have been detected in the county.

Furthermore, a syringe testing program within Cuyahoga County has detected mitragynine in 1 sample. The program monitors for 7-OH, but it has not been detected in any samples. This sample pool (n=701) was collected between August 2024 and July 2025.[2]

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[1] Data Provided by the Cuyahoga County Medical Examiner's Office.
[2] Data Provided through Cuyahoga County's Pilot Drug Checking Program. This work was supported by the Centers for Disease Control and Prevention (CDC) of the U.S. Department of Health and Human Services (HHS) as part of Overdose Data to Action: LOCAL (CDC-RFA-CE-23-0003). The contents are those of the author(s) and do not necessarily represent the official views of, nor an endorsement by, CDC/HHS or the U.S. Government.

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