

Cannabis Impairment Detection in the Workplace

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Extract-ED

Concentrated Education

Summary

The nationwide trend of legalizing marijuana for medical and recreational use has placed employers in an anomalous position. This presentation is designed to educate team members on all things marijuana. The course includes a review of types of cannabis plants, how marijuana is grown and cultivated, cannabis concentrates and how they are made, how cannabis is used, and research conducted to show a correlation between cannabis use and indicators of impairment. It also covers tests for impairment and how to administer them, cannabis in the body, and what it means on a chemical test (urine and oral fluid).

A handwritten signature in black ink, appearing to read 'Ryan Hutton', with a stylized, cursive script.

Ryan Hutton,
Lead Marijuana Trainer

Reasonable Suspicion Testing

Reasonable suspicion testing, also known as for-cause drug testing, is performed when supervisors have evidence or good cause to suspect an employee of drug use.

Cannabis 101

Understanding marijuana and the marijuana plant help build the attendee's confidence when forced to deal with marijuana-related incidents. Marijuana plants can be either male or female. For purposes of this class, the significant difference between the two is that female plants produce flowering buds that contain mind-altering compounds like THC (tetrahydrocannabinol) as well as other active compounds like CBD (cannabidiol) which are not mind-altering. Marijuana users, therefore, prefer female plants.



Trichomes are the resin glands of the plant that contain THC, CBD, and other compounds. These sometimes appear as crystals or a fuzzy coating. Extracting trichomes from a plant also preserves terpenes which are the oils that give cannabis its distinct smell and taste.



There are four major types of marijuana: Sativa, Indica, Ruderalis, and Hybrids.

Sativa:

Sativa plants will grow from four to fifteen feet high and are loosely branched. The leaves will have six to twelve blades. Using a Sativa strain of marijuana will induce a “head high,” users will feel euphoric and uplifted.

Indica:

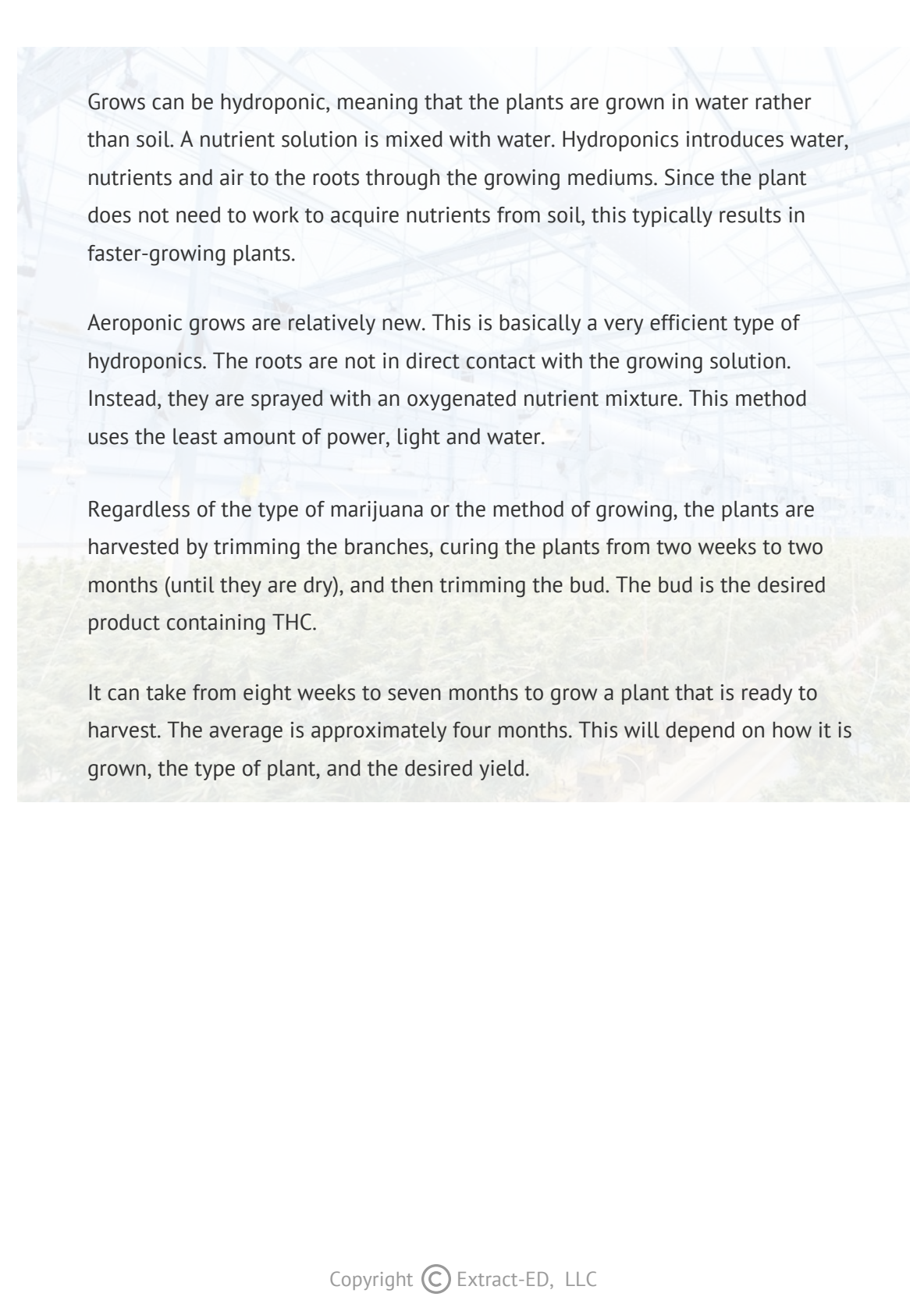
Indica plants are shorter, growing to a maximum of four feet tall, and will have a bushy appearance. The leaves will have wide, short and thick blades. Using an Indica strain will induce a “body high,” users will experience couch lock. Indica strains will also act as an appetite stimulator.

Ruderalis:

Ruderalis plants are also shorter, growing to a maximum of four feet tall. Its leaves will have fewer blades. Ruderalis plants have low bud production and low THC content so are not as popular for use.

Hybrid:

Hybrid plants are mixtures of the other types. They can be designer strains produced to achieve a mix or balance of effects. Most hybrids will be either Sativa or Indica-dominant, meaning a user will experience more of the typical effects of the dominant strain.



Grows can be hydroponic, meaning that the plants are grown in water rather than soil. A nutrient solution is mixed with water. Hydroponics introduces water, nutrients and air to the roots through the growing mediums. Since the plant does not need to work to acquire nutrients from soil, this typically results in faster-growing plants.

Aeroponic grows are relatively new. This is basically a very efficient type of hydroponics. The roots are not in direct contact with the growing solution. Instead, they are sprayed with an oxygenated nutrient mixture. This method uses the least amount of power, light and water.

Regardless of the type of marijuana or the method of growing, the plants are harvested by trimming the branches, curing the plants from two weeks to two months (until they are dry), and then trimming the bud. The bud is the desired product containing THC.

It can take from eight weeks to seven months to grow a plant that is ready to harvest. The average is approximately four months. This will depend on how it is grown, the type of plant, and the desired yield.

Cannabis Products

Marijuana concentrates—wax, BHO, shatter, kief, etc.—are becoming increasingly popular. Concentrates are high potency and can have extraordinarily high levels of THC, from forty to eighty percent or more. As a result, the physical and psychological effects on the user can be much more intense than when plant marijuana is used.

Kief/Sift/Pollen.

Kief, also known as dry sift or pollen, are the tiny, sticky crystals that cover the cannabis flower. Kief refers to the resin glands that contain terpenes and cannabinoids. Kief can be extracted using a three-chamber grinder that finely grinds the cannabis and collects the kief in a small compartment. The purer the kief the lighter the color will be. Kief that appears green still includes plant matter. Kief that has been cleaned well will often be off-white in color.



Kief can be used by sprinkling it on top of a packed bowl of cannabis, known as “crowning the bowl.” This can dramatically increase the overall potency of what is being consumed. Kief can also be added to a joint by sprinkling it on before the joint is rolled. Or, you can dampen the outside of a joint with water or wax and roll it in kief to make a “twax joint.” It can also be made into hash.

Moon rocks are top-quality “nugs” (slang term for a chunk of the bud material of high-quality cannabis) covered in oil and rolled in kief. These are very high potency and relatively easy to make. Marijuana oil is heated then used to coat buds. The buds are then sprinkled with or dredged in kief. After they harden, they can be broken up and sprinkled into a bowl of cannabis. The THC concentration of moon rocks can be up to fifty or sixty percent. The intense high experienced is close to that achieved by dabbing. Moon rocks are also sometimes referred to as caviar.



Hash or hashish is a highly potent, concentrated form of cannabis that comes from the dried resin of a female cannabis plant. Hash is harvested by collecting trichomes by hand, with a motorized sifter, or with a kief collector in a grinder. The residue is then pressed into compact blocks of highly concentrated cannabis that can be smoked, vaporized, or dabbed. Hash is much more potent than regular plant material. Bubble hash is a more refined form of hash that can be made by submerging plants into ice water and then removing and drying the trichomes. Typically, the trichome-rich flowers are frozen, soaked in ice water, agitated manually, then filtered through “bubble bags”—plastic filtration bags with holes of increasingly smaller size.



Marijuana **rosin** is made by extracting THC from plant material using a solvent-less process. The flower, kief, or hash is heated and pressed simultaneously. As this happens, a sappy substance will ooze from the plant material. This form is becoming more popular as there is no concern of cross-contamination with solvents. If done correctly, rosin can rival the flavor, potency, and yield of solvent-based extraction products.



Resin is a marijuana concentrate made using a solvent rather than heat to extract the trichomes. The mixture is then heated to remove the solvent from the material before it is consumed.

Butane hash or honey oil (BHO) is a potent type of resin that uses butane as the solvent to extract cannabinoids and terpenes from plant material. The final product can be known as oil, wax, budder, or shatter. Because butane is a volatile substance, this extraction process is risky. To make BHO, plant matter is placed into a long tube or pipe. Butane is then forced through the pipe, causing THC and cannabinoids to be extracted. The result is a dense and potent waxy substance. Before this can be consumed, the butane needs to evaporate. Although this will occur naturally, most often people try to speed up the process by applying heat. Because butane is highly flammable, this can result in explosions. BHO can also be risky to consume because there is a chance that not all the butane has been removed. These substances can have THC contents of ninety percent or more so small amounts can result in intense highs.



CO2 oil is a concentrate made using carbon dioxide to extract the terpenes and cannabinoids. Because CO2 is a natural product and this method does not use any flammable solvents, it is considered safer than BHO. In this method, special equipment is used to change CO2 gas into a liquid using pressure and temperature. The liquid CO2 is passed through high-grade cannabis in an extractor. The CO2 pulls the trichomes from the plant material. The mixture is passed through a separator, and the terpenes and cannabinoids are collected.



Rick Simpson Oil is a concentrated form of cannabis oil purported to have medicinal benefits. It was developed by a Canadian man named Rick Simpson who treated skin cancer with a cannabis oil topically applied. This extraction method is solvent-based and relies on a rice cooker to evaporate the solvent. It is recommended to use Indica strains.



Methods of Ingestion

Vaping is inhaling and exhaling the vapor produced by an electronic cigarette or similar device. Even among children, vaping has become increasingly popular. In 2012, 1.7 million students in grades 6-12 admitted to vaping. In 2018, more than 3.8 million middle and high school students admitted to using an e-cigarette within the past 30 days, including 4.9% of middle school students and 20.8% of high school students.

Some people consider vaping to be safer than smoking traditional cigarettes. But, when vaping, you are still inhaling volatile organic compounds; cancer-causing chemicals; metals such as nickel, tin, and lead; ultra-fine particles; and diacetyl, which is linked to lung disease. Fifty-eight percent of e-cigarette users say they switched to vaping to quit smoking.

Dabbing is another way to inhale vaporized marijuana. It is most commonly used to ingest waxes and other concentrates. To dab, a user will need a dab rig, a nail, a carb cap, a heat source, and a concentrate. The nail is placed in the rig and heated until it is red hot. After the nail has cooled slightly, the concentrate is placed on the nail and is vaporized. Once it has turned to vapor, the user will cover the nail with the carb cap, then inhale the vapor from the top. The vapor passes through water to cool it off and is then inhaled.

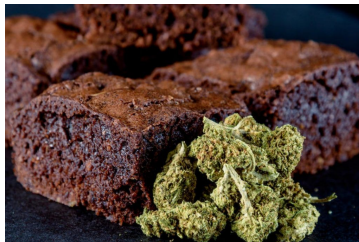


Dab straws are a simpler way of ingesting THC concentrates. The user heats a cylinder straw, typically made of glass, until it is hot enough to turn concentrates to vapor; they will then touch the heated end to the concentrations and inhale from the opposite end.

Because dabbing uses concentrates, users are consuming high-potency THC. The effects of dabbing can be felt quickly, and it produces an intense high.



Marijuana can also be consumed via **edible products**—such as candy, baked goods, and drinks—which are infused with THC. These typically involve a much slower release of THC and a delayed high.



Indicators of Impairment

Observable signs of possible cannabis impairment include:

- Red, bloodshot eyes
- Relaxed inhibitions
- Dilated pupils (possibly)
- Odor of marijuana
- Slow movements
- Dazed appearance
- Short term memory loss
- Shaking (body tremors)



With respect to impairment testing, observers will NOT observe Horizontal Gaze Nystagmus in a cannabis-only case.

On the Walk and Turn, 80.5% of marijuana-impaired drivers will have two or more clues. And, 55% will exhibit 2 or more indications on the One Leg Stand. There are additional indicators of impairment that may also be observed in the other impairment tests. On the Finger to Nose test, 94.4% of marijuana persons will have two or more misses. Lack of Convergence will be observed 78.8% of the time, eyelid tremors 39% of the time, and rebound dilation 70.9% of the time.

Tests For Impairment

There are 6 primary tests workplaces use to help determine impairment. These tests include the Horizontal Gaze Nystagmus Test (HGN), Walk and Turn Test (WAT), One Leg Stand Test (OLS), Modified Romberg Balance Test (MRB), Finger to Nose Test (FTN), and the Lack of Convergence Test (LOC).

The HGN Test checks for involuntary jerking of the eyes as the eyes gaze to the side. This is caused by commonly abused drugs, including Central Nervous System Depressants, Inhalants and Dissociative Anesthetics.

The WAT requires the subject to concentrate on more than one thing at a time, including balancing, small muscle control, and short-term memory. This test includes eight (8) validated indicators for impairment. During this test, the observer is looking for 2 or more indicators of impairment.

The OLS requires the subject to concentrate on more than one thing at a time, including balancing, small muscle control, and short-term memory. This test is comprised of four (4) validated indicators of impairment. The observer is checking for 2 or more of the indicators of impairment.

The MRB Test requires the subject to balance and estimate the passing of time. If under the influence of certain drugs or alcohol, performance on the MRB test may cause the subject's time estimation to be significantly slower or faster than 30 seconds. During this test, the observer is checking to see if the subject sways, has eyelid tremors, and the ability to estimate time in 30 seconds. Performance outside the range of plus or minus 5 seconds should be considered with other evidence during the impairment decision process.

The FTN test differs from the other three tests in that the examiner must continue to give instructions to the subject throughout the test. The subject is asked to close their eyes, tilt their head back to a 45-degree angle and touch the tip of their nose with the tip of their right, or left index finger, depending on the command given. The FTN Test is an excellent test for cannabis impairment. Some observations of impairment that can be made during this test are:

- False start: The subject began to move an arm before being instructed to do so.
- Failed to close eyes: The subject did not close their eyes as instructed.
- Failed to tilt their head back: The subject did not tilt head back at an angle as instructed.
- Wrong hand: Uses wrong hand.
- Wrong finger: Uses the wrong finger.
- Searched: Makes distinct vertical or horizontal movements on approach to nose prior to contact.
- Rapid jerky movement or slow lethargic movement: A movement that seems unnecessarily fast or slow.

The LOC Test checks for the eye's inability to converge. Convergence is the crossing of the eyes that occurs when a person is able to focus on a stimulus as it is pushed slowly toward the bridge of the nose. If the eyes are unable to converge, this may provide another clue regarding the presence of CNS Depressants, Inhalants, Dissociative Anesthetics, and Cannabis.

Chemical Testing

When a drug other than alcohol is suspected to cause the impairment observed, a sample for testing other than breath should be collected.

Although urine is historically acceptable as a sample for testing, it should be known that urine testing will show past use, not active use. This is because urine is a waste product. It shows what was in a person's system at some time in the past, not what is currently in the system and causing impairment. Studies have shown that carboxy THC (a non-psychoactive metabolite) can be detectable in urine for up to 77 days after use.

To understand chemical test results, you must first understand THC. There are over 421 chemicals in cannabis, 61 of which are cannabinoids. Not all of these compounds are psychoactive. Delta 9-THC is the substance we are most concerned with as it is one of the primary psychoactive compounds. When THC is inhaled, it is rapidly absorbed in the lungs and is detectable in seconds. The peak concentration of THC happens within 3 to 10 minutes. It is then metabolized into hydroxy THC (which is also psychoactive but which our lab cannot test for). Peak concentrations of hydroxy THC happen in 15 minutes. Hydroxy THC is then metabolized into carboxy THC, which is not psychoactive. Do you need a test result that shows a psychoactive substance to establish impairment? Not necessarily. This is because THC concentrations and impairment do NOT dissipate at the same rate.

Oral fluid testing seems to be the best choice for workplace drug testing. Oral fluid is typically budget friendly and non-invasive, like urine, but detects the active cannabinoids in the body. This is important as the use of cannabis is likely to increase with the legalization of medical and/or recreational cannabis. Most entities have yet to come to the realization that legal cannabis consumption will often take place outside of work. Urine testing was an acceptable practice prior to legalization and may also be utilized if the workplace has a policy against cannabis use, or testing positive for THC and/or its cannabinoids.