Effective cannabis testing protocols for workplace safety in South Africa post legalisation: Navigating the new normal

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The legalisation of private cannabis use in South Africa presents significant challenges for occupational health, especially in safety-sensitive environments. This article analyses the medical, legal and ethical issues surrounding workplace cannabis use, focusing on the pharmacodynamics and pharmacokinetics of delta-9-tetrahydrocannabinol (THC), the primary psychoactive compound. The recent legal precedent that critiques the effectiveness of zero-tolerance policies is reviewed, and the establishment of *per se* THC thresholds that are medically and legally sound is proposed. The study advocates for a tailored approach to risk categorisation and testing protocols in workplaces, aiming to support occupational health professionals in developing policies that are effective, ethical and compliant with legal standards.

Keywords: cannabis, workplace, drug testing, policy

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The private use of cannabis has been legalised in South Africa (SA), following a legal history that has evolved over many years,[1-7] and is regulated to a similar extent as alcohol, albeit with some differences, such as the absence of legislation creating a commercial market for 'adult-use' cannabis.[8]

The post-legalisation era has imposed many potential legal challenges about threshold concentrations related to impairment and abuse of cannabis. For instance, workplaces face difficulties in defining 'fit for duty' standards for safety-sensitive roles, where even residual levels of delta-9-tetrahydrocannabinol (THC) may pose risks. On public roads, establishing clear and scientifically supported *per se* limits for THC, to differentiate between impairment and mere usage, is contentious. In schools, educators must navigate policies balancing students' rights with maintaining drug-free environments. Similarly, in parental rights and responsibilities, courts face challenges in determining whether cannabis use impacts parenting capacity or child safety. The regulation of private cannabis use to prevent impairment in a safety- and risk-sensitive environment is deemed to invite legal challenges, because such regulation has the potential to prescribe private behaviour infringing on the right to privacy.

Drug and alcohol testing in humans is regarded as a biomedical intervention, which places the issue within the bounds of medical law and ethics. Therefore, occupational health medical professionals are approached for advice on strategies for testing and for the interpretation of test results that may indicate risk to others, and to comment on whether an individual is under the influence of the cannabis psychoactive constituent, THC.

The most popular approach in SA to address this issue currently is by confirming the presence and concentration of THC, or its metabolites, in urine.[9] If the concentration exceeds a 'cut-off' concentration, the individual is classified as intoxicated or under the influence. A recent Labour Court of Appeal case ('Barloworld case' hereafter) obviated this approach by requiring evidence that proves that an office worker who failed a cannabis urine test was under the influence to the extent that she posed a risk to the health and safety of the organisation, which warranted her dismissal.[10] A urine test for THC on its own was not sufficient evidence to this extent. This decision sent shockwaves throughout the industry, which currently most often follows a 'zero-tolerance' approach, and which believed that it was adequate evidence for a dismissal.[11] It is important to note that drug testing in workplaces and other safety and risk-sensitive environments functions primarily under the supervision of medical professionals.

This article ventures into the issue of whether a THC concentration in a biomatrix is appropriate for presuming psychomotor impairment, and what the correct approach should be to implementing testing for cannabis use in cases of off-duty use with the potential of on-duty impairment. It is important to approach this dilemma on an integrative level by taking the pharmacodynamics (psychomotor effects), the pharmacokinetics of THC, the SA regulatory framework and the actual testing of an individual into account.

Medical-scientific aspects of cannabis consumption

The acute effects of cannabis

The acute effects of cannabis on human physiology and behaviour are complex, and vary based on factors such as dosage, user experience and consumption method. Users typically experience euphoria, relaxation and altered perceptions, which can shift unpredictably to anxiety and paranoia. Physiologically, cannabis increases heart rate and appetite, and causes dry mouth and throat and conjunctival suffusion, among other effects, and can impair cognitive and psychomotor functions such as memory, co-ordination and attention – effects that are predominantly dose-dependent.[12-23] Studies, including those involving flight simulators, indicate significant performance impairments in tasks requiring sustained and divided attention, even though users might not perceive their own impairment.[24-27] Notably, the severity of these impairments is influenced by the

user's experience with cannabis, with novices experiencing more substantial effects.[28,29] Additionally, while some research suggests that users may attempt to compensate for their impairment by adjusting their behaviour, this is typically insufficient to overcome the loss of psychomotor skills.[30-32]

The duration of the effects after cannabis use

The effects of smoking cannabis are almost immediate, peaking within 10 - 30 minutes and typically lasting about 2 hours. However, significant impairments in functions such as tracking ability, time estimation and memory can persist for up to 24 hours after use.[33-37] Chronic, heavy users may experience neurocognitive deficits that last even after 28 days of abstinence, with studies noting persistent impairments in neuropsychological performance during the initial week of abstinence.[38-43] Research indicates that the duration of cannabis use critically impacts performance, with residual THC levels potentially underpinning these long-lasting effects.[44,45]

Cannabis use in the context of the workplace

Studies confirm that both acute and chronic cannabis use can impair cognitive functions and mood in workplace settings. Wadsworth *et al.*[46] observed that cannabis users experience impairments in working memory, psychomotor speed and episodic recall throughout the work week, suggesting a hangover-like effect that intensifies with frequent use. Additionally, these users exhibited no heightened awareness of their decreased performance levels, despite measurable deficits in cognitive performance. Furthermore, Breitstadt and Kauert[47] noted that cannabis consumption could lead to workplace misbehaviour due to impaired decision-making and misinterpretation of signals, impacting the safe operation of machinery. Blows *et al.*[48] linked habitual cannabis use with a significant increase in car crash injuries, underlining the extended risks associated with its use.

Overall, cannabis negatively affects work performance through various cognitive and psychomotor decrements, with effects lasting up to 24 hours post use, complicating the ability of users to compensate for these impairments effectively. This means that someone using cannabis in the evening could still be under its influence the following day at work. Additionally, combining cannabis with alcohol worsens and prolongs these impairments. Chronic cannabis use continues to affect job performance long after the effects of intoxication have subsided, particularly in roles demanding high cognitive skills. This impairment can persist even during periods of abstinence.

Pharmacokinetics and interpretation of THC in biological fluids

Smoking remains the principal method for cannabis administration, swiftly delivering THC into the bloodstream. Detection in plasma is almost instantaneous, with THC levels measurable within seconds following inhalation.[49] The high lipid solubility of THC ensures its prolonged retention in fat tissues, contributing to its extended half-life of >4 days in chronic users.[50] This persistent presence is facilitated by slow release from fat stores and significant enterohepatic recirculation. Metabolism occurs primarily through hydroxylation by hepatic cytochrome P450 enzymes, producing the active metabolite 11-OH-THC, [51,52] while 11-nor 9-carboxy-THC (THCCOOH) and its glucuronide conjugate are identified as primary inactive end products, showing low renal clearance due to extensive protein binding.[53]

After smoking ceases, plasma THC concentrations decrease rapidly, though detection times for metabolites such as THCCOOH extend significantly longer.[54] The primary urinary metabolite, THCCOOH glucuronide, shows peak concentrations between 89.8 and 153.4 ng/mL within 8 - 14 hours post consumption, reflecting substantial variability dependent on THC potency and individual metabolic differences.[55] This variability complicates the interpretation of urine tests, which, although indicative of prior cannabis use, do not reliably reflect recent consumption, impairment, or the specifics of drug exposure.[56,57]

In contrast, cannabinoids in oral fluid provide a relatively more accurate marker for recent use, with THC concentrations in this matrix aligning more closely with those in plasma and associated physiological and behavioural effects. However, broad inter-individual variability limits their utility as definitive impairment indicators.[58-61]

Blood, plasma and serum analyses also present challenges. Unlike alcohol, where blood concentrations can be better correlated with impairment levels, THC follows a less predictable impairment pattern, complicating legal and forensic assessments of drug influence on behaviour, particularly in driving.[62] Although controversy still surrounds the interpretation of blood cannabinoid results, a dose-response relationship has been demonstrated between smoked THC and THC plasma concentrations.[63,64]

Regulatory framework

For the sake of brevity, this article will focus only on the components of the SA legal system that are relevant to the Barloworld case, namely the Constitution of SA, statutes (Acts), common law and case law.

Statutes

Under statutory law, the Cannabis for Private Purposes Act 7 of 2024 (hereafter referred to as the 'Cannabis Act'),[65] which has been assented to and published for general information, aims to legalise the private use of cannabis by adults in private settings. Additionally, the Cannabis Act seeks to amend the National Road Traffic Act (hereafter referred to as the 'NRTA')[66] by introducing '*per se*' cut-off concentration limits for THC in blood, alongside the existing limits for blood alcohol. While the Cannabis Act has been assented to and published for informational purposes, it has not yet been promulgated, and is therefore not yet in effect. Moreover, unlike provisions relating to alcoholic beverages, the Act does not establish a commercial market for 'adult-use' cannabis. Future legislation may address this gap in the current legal framework. The meaning of '*per se*' in this context refers to the fact that the blood concentration test result stands on its own when used as evidence in over-the-limit driving-under-the-influence cases.

The NRTA is a prime example of well-developed legislation in our country. It follows a dual approach whereby a driver may either be prosecuted for being under the influence of alcohol, or for exceeding a specified *per se* concentration limit. For the sake of simplicity, the first leg is referred to as the 'impairment' part, and the second leg as the '*per se*' part. *Per se* prosecution does not require proof of impairment or intoxication; however, prosecution based on 'impairment' does. Incorporating the *per se* section into the NRTA holds many functional advantages, such as enhancing the practicability of roadside testing and countering possible subjectivity of impairment or sobriety testing, which has the potential to raise legal challenges regarding the observations made during sobriety testing.[67]

The Occupational Health and Safety Act 85 of 1993 ('OHSA' hereafter)[68] mandates workplace substance policies as follows: 'Intoxication: (1) An employer shall not permit any person who is or appears to be under the influence of intoxicating liquor or drugs to enter or remain at a workplace; (2) No person at a workplace shall be

under the influence of, or have in their possession, or consume, or offer any other person intoxicating liquor or drugs'.

Common law and the employment contract

Under common law, employees are required to carry out their duties as specified in their employment contracts. They are expected to perform their tasks diligently and efficiently, avoiding impairment from substances, as such impairment would constitute a breach of contract. This breach could justify disciplinary actions for failing to meet the performance expectations of arriving fit for work. Employers also have a common-law obligation to ensure workplace safety, and may seek to mitigate other organisational risks.

A crucial aspect of an employment contract is the specification of *per se* concentrations for substances that could impair an employee's ability to perform their duties. These thresholds, detailed in the organisation's drug and alcohol testing policy, establish limits that employees must not exceed. Ensuring adherence to these thresholds, as stipulated in the employment contract, is vital. Employees must voluntarily consent to these terms during the hiring process, ensuring that this consent process respects Constitutional rights to bodily integrity, and adheres to medical ethics.[69-71] An employer will effectively follow a dual approach similar to the NRTA by compliance with the OHSA and by incorporating *per se* cut-off concentrations in their employment contracts. The OHSA covers the 'impairment' part, and the *per se* part is added by the employment contract.

Case law

Shortly before the Cannabis Act was assented to, the Labour Court of Appeal judgement for the Barloworld case became available. It was held that a urine THC test was not sufficient to dismiss a person for being under the influence without clear proof to this effect, and that their work performance was influenced as such. It was furthermore stated that drug testing policies may not be unnecessarily stringent to the extent that they prescribe to an individual private behaviour, thereby invading their right to privacy. The judge did not hold that testing is prohibited; however, a rational reason must exist why someone is tested.

The Marasi v Petroleum Oil and Gas Corporation of SA case emphasised the importance of aligning drug testing policies with workplace requirements, acknowledging that blanket approaches and indiscriminate testing infringe on employees' rights. The court upheld that 'cut-offs' and testing methods must be reasonable, context-specific and justified to ensure fairness and protect privacy while maintaining safety standards.[72]

The selection of an individual for testing must not be done indiscriminately, therefore, in terms of a 'zero-tolerance' drug testing policy, to the extent that it regulates an individual's private life if there is no reason. From this, it follows that a 'blanket' approach to testing employees is not acceptable. With drug testing being a biomedical intervention, it is essential to motivate why a person is tested for drugs such as THC, and more specifically, with reference to the specific biomatrix, cut-off concentrations, and when they are tested.

Even though the amended NRTA sets a precedent as an example of how alcohol and THC use are regulated for driving on public roads in terms of its dual approach, it does not apply to workplaces unless driving on public roads is part of the job. In the absence of formal statutory regulations for workplace drug testing in SA, it is an employer's responsibility to set criteria for the detection of impairment and select *per se* levels on a rational medical-scientific basis to minimise risk to health and safety. The Constitutional approach to the limitation of a human right, such as the use of cannabis in private, requires that 'the importance of the purpose of the limitation' and 'less restrictive means to achieve the purpose' must be considered, which applies to all biomedical interventions as well.[73]

Per se concentrations for workplaces

The next step is to decide which concentrations of THC or its metabolites to use in the specific biomatrix to detect problematic cannabis use, i.e. establish the *per se* levels for THC in combination with a particular biomatrix. The *per se* level must be chosen rationally and must not be too restrictive without sufficient reason, but by keeping the requirements of the job in mind. The primary goal of the *per se* approach is to employ a cut-off concentration for THC in a specific biomatrix that acts as a safety net that prevents impaired or possibly impaired employees from performing risk-sensitive tasks – err on the side of caution. Furthermore, the *per se* concentration in the particular matrix must have sufficient diagnostic sensitivity and specificity to correctly identify 'problematic users' and allow the others to proceed with their tasks. It is not the goal of using a *per se* level to prove that a person was intoxicated or impaired.

Ramaekers *et al*.,[74] who studied drivers, found that THC serum concentrations between 2 and 5 ng/mL establish the lower and upper range of a *per se* limit for defining general performance impairment above which drivers are at risk. It was furthermore concluded that the predictive validity of a *per se* limit is confined to the driving population at large, and not necessarily applicable to each individual driver. Individual drivers can vary widely in their sensitivity to THC-induced impairment, as evidenced by the weak correlations between THC in serum and the magnitude of performance impairment. Even at a 5 ng/mL limit, only 70% - 90% of the observations were indicative of impairment, meaning that in 10% - 30% of the observations, there was no impairment at all. The purpose of a *per se* limit is to indicate the average THC concentration above which drivers are at risk, and should be interpreted as such.

Establishing *per se* levels for a mixed population, as found in a typical industry in SA, would be a daunting task owing to the large variation in risk related to various jobs. The aim of a *per se* level is not to prove impairment but to act as a 'safety net', and simultaneously enhance the practicability of testing. Internationally, *per se* levels for THC have been established for workplaces by the Substance Abuse and Mental Health Services Administration, USA, and the European Workplace Drug Testing Society (EWDTS) at 2 ng/mL in oral fluid, which also corresponds with the *per se* level for blood for professional drivers in SA.[75,76] It is the opinion of the author that a level of 2 ng THC/mL in oral fluid or blood would serve high-risk workplaces in SA well, and to accommodate low-risk workers, 5 ng THC/mL in oral fluid or blood may be considered. The 5 ng THC/mL blood is also the *per se* level prescribed for normal drivers in the NRTA.

Classifying workers into low-, medium- and high-risk groups and tailoring the type of testing and *per se* levels to each category would effectively accommodate cannabis users while safeguarding workplace safety. This classification should be underpinned by detailed risk assessments designed to align closely with the specific demands and safety requirements of each job role.

The author proposes that pre-employment, reasonable suspicion, post-incident and random testing should all be integral to the testing scheme. Pre-employment testing ensures that new hires meet workplace standards before starting safety-sensitive tasks, while post-incident testing identifies whether substance use may have contributed to workplace accidents or errors. Reasonable suspicion testing is conducted when observable signs or behaviours suggest impairment, helping to address potential risks promptly and fairly. Random testing, on the other hand, acts as a deterrent

and ensures compliance with the policy, particularly in high-risk environments.

The first three types of testing should be included for low-risk categories, with all four applicable to medium- and high-risk groups. Additionally, employing two different *per se* levels of THC in oral fluid – 2 ng/mL for high-risk and 5 ng/mL for both low- and medium-risk groups – would also be rational. This differentiation ensures that the testing protocols are both appropriate for the level of risk associated with different job roles, and compliant with legal standards.

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