

Caught in Contamination: Revisiting the Burden of Proof in Doping Sanctions for Supplement Use

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Abstract

The globalization of dietary supplement use, especially among athletes, has increased the possibility of inadvertent doping as a result of contaminated supplements. This paper reflects on the ethical and legal contradictions of the strict liability system integrated within the exemplar of the World Anti-Doping Code that makes athletes exclusively liable in case of the presence of a prohibited substance in their body, regardless of intent or fault. Using case law, scientific complexity, and socio-economic inequality, the research shows how this system over-prosecutes athletes in resource-constrained contexts who have no access to legal, financial, and scientific resources to mount a credible defense. This paper employs a multidisciplinary approach combining doctrinal legal analysis, policy critique, and case-based examination of arbitration jurisprudence. The paper suggests the use of tiered standards of evidence, improved traceability of supplements, and the institution of a global body that oversees supplement safety are needed. Such reforms would be an attempt at reconciling the goals of discouraging doping and a desire to promote fairness and procedural justice. The article identifies structural imbalance inherent in the implementation of anti-doping strategies and disrupts the current balances, demanding that regulatory norms be aligned with standards or human rights and athletic integrity.

Keywords

Strict Liability, Anti-Doping Law, Contamination

1. Introduction

The global use of dietary supplements (DS) has increased in recent decades, spe-

cifically among athletes who seek enhanced performance, injury prevention and faster recovery. With the passing of the Dietary Supplement Health and Education Act (DSHEA) in 1994, the US sales of supplements increased to more than 33 billion dollars by 2012 and the worldwide sales recorded more than 150 billion dollars as of 2023 (Knapik et al., 2016). Research findings indicated that between 60 - 80 percent of athletes have taken supplements without familiarizing themselves with the potential risk of using unregulated supplements (Jagim et al., 2023). Supplements are not under the same regulatory scrutiny as pharmaceuticals, although they have gained great popularity (Bailey, 2020). Most are manufactured using poor standards, which increases the likelihood of contamination with prohibited substances such as anabolic steroids and stimulants (Mathews, 2018). The use of inadequate labeling, cross-contamination, and premeditated adulteration of the product also exposes the athlete to an unwary contravention of the anti-doping rule (Jagim et al., 2023). Since the liability system of the anti-doping agencies is strict, even the minimal traces of contaminants may lead to harsh penalties (Shahlaei, 2023). Such inconsistencies in regulating supplements and enforcing doping pose an increasingly dangerous challenge to fair play and the health of the athlete.

A critical distinction must be made at the onset between unintentional contamination and deliberate adulteration of DS. Contamination typically arises from negligent manufacturing practices such as lack of proper cleaning of common equipment, unintentional cross-contact during production, or lack of effective quality controls when minute amounts of banned substances end up in a product without the manufacturer's intention (Mathews, 2018; Walpurgis et al., 2020). In contrast, the term adulteration indicates the intentional addition of ingredients with pharmacological activity, usually to make a product more effective in the way it is marketed, fully aware that such an addition could cause a violation of regulatory controls (Martínez-Sanz et al., 2017). The legal and ethical consequences of the two phenomena differ considerably because, in contrast to adulteration, which indicates an evident violation of consumer protection standards and, in many cases, criminal responsibility of manufacturers, contamination operates in regulatory grey zones, particularly where dietary supplements are not strictly tested or validated by independent parties (Van Thuyne et al., 2006). Nevertheless, the World Anti-Doping Code imposes sanctions on athletes regardless of whether the infraction arises from accidental contamination or fraudulent adulteration, thereby collapsing critical distinctions in culpability. This paper focuses primarily on inadvertent contamination and the disproportional burdens it places on athletes under the current strict liability regime, while acknowledging the blurred boundaries and regulatory deficiencies that allow both practices to persist.

Although the majority of doping offenses connected with tainted supplements are unintentional, the resulting sanctions are often severe (Moston & Engelberg, 2019). Doping Athletes who are inadvertently administered restricted materials because of the contamination of supplements still face penalties under the princi-

ple of strict liability in the World Anti-Doping Agency (WADA) ordinance, which holds athletes responsible despite claims of blame and fault (Matore, 2022). The sanctions themselves may include everything, starting with an official warning to multi-year and even permanent ineligibility depending on the nature of the substance and the context (Balsam, 2023). In addition to the literal sporting penalty, the sportsmen encounter their disclosure by the community, destruction of their reputation, and the impossibility to achieve competitive outcomes, medals, and records (Bolokan et al., 2021). The social cost is also huge; doping can result in loss of sponsorship agreements, relationship destruction and social ostracism (Crompton, 2014). Furthermore, performance-enhancing substances, when used intentionally or otherwise, present significant health implications, cardiovascular illness, endocrine perturbation, and psychological issues, including depression and anxiety (Börjesson et al., 2020; Didymus & Backhouse, 2020). These consequences become even more heartbreaking in situations where athletes get penalized even after trying their best to make clean competitions, and it is clear that these actions portray serious ethical conflicts in the current system of anti-doping enforcement.

The significance of this study is to critically examine the growing yet underexplored issue of global sports doping violations due to contaminated dietary supplements and the misplaced burden of proof on athletes to show innocence (Mathews, 2018). While in the last few years, anti-doping laws greatly improved, little to no concerns were related to the infrastructural and legal disadvantages that athletes experienced due to the bad regulation of supplements. The given study extends the knowledge as it points to the question of the legal and ethical imbalance that arises due to the strict liability framework, the lack of proper regulatory oversight of the supplement industry and puts the integrity of sport and the rights of athletes at risk. It poses some serious concerns regarding fairness, responsibility, and the sufficiency of the available safeguards, especially among the athletes who train within resource-poor environments. This study offers a critical, evidence-informed analysis of anti-doping adjudication, drawing on selected CAS decisions, scholarly literature, and regulatory instruments.

2. Strict Liability and the Burden of Proof in Anti-Doping Law

2.1. Understanding Strict Liability in the WADA Code

Strict liability is one of the fundamental provisions of the WADA code, and its application is legal to all the athletes who are included in its testing program (Du Pisani, 2013). Through organized sport conducted in a WADA-compliant system, participating athletes enter into a contractual relationship that implicitly binds them to this rule. In strict liability, a player is liable when a banned substance is found in his body, whether it is because of intent, carelessness, or even ignorance (Kambhampati & Star, 2021; WADA, 2022). This implies that anti-doping rule violations (ADVs) can be proven without the presence of fault even in such instances of accidental consumption, like through using contaminated supplements.

This doctrine is repeatedly supported by the Court of Arbitration for Sport (CAS) as well as by various domestic courts, as it supposedly implies zero tolerance, facilitates fair enforcement, and is an effective deterrence (Viret, 2016). *USA Shooting and Quigley v. In UIT* (CAS94/129), the CAS supported its decision to impose sanctions without fault, which is necessary to maintain integrity within sports even in instances when an athlete does not have any intention to cheat (Du Pisani, 2013).

Though these principles ease adjudication in that they strengthen uniformity in sanctions, the fundamental ethical and legal issues are a concern. According to critics, strict liability contradicts other important legal standards, including the presumption of innocence and the reasonable measure of punishment, especially when applied to situations that have seen the athletes make due diligence (Ahmed, 2021; Houlihan & White, 2003). In addition to this, the need to disprove the will or demonstrate the contamination can almost always be scientific and legally based, which is beyond the means of many sportspeople and particularly those of resource-starved backgrounds (Viret, 2016). Therefore, despite the intended fairness of the strict liability, it may deliver unfair results in reality and punish athletes due to their inability to demonstrate a lack of guilt in a complicated regulatory system. This strain is a clear indication that a re-evaluation of the use of strict liability should be done, and more so in instances concerning the potentially tainted supplements.

2.2. CAS Jurisprudence and Evidentiary Requirements

When a banned substance is detected in the biological sample of an athlete after the test by a laboratory that has the status of a WADA-updated body, the responsibility of the proof is transferred to the athlete, using Article 3.2.1 of the World Anti-Doping Code (WADA, 2021). The Code introduces an irrebuttable presumption that the laboratory results are reliable and the anti-doping agencies do not need to establish the mode through which the substance got into the body of the athlete. Rather, the athlete has to prove that the source of the drug was accidental, under a balance of probabilities, most often, the contaminated supplements or food. This shift in the burden of proof adds another level of complexity and complicates the legal process, because, as Rigozzi & Quinn (2014) makes clear when describing the evidentiary process conducted before the CAS, the burden is, in practice, on the athlete to provide a scientifically feasible explanation to the finding of a banned substance when, in theory, the opposite should be true (Hamerník, 2013). This is not at the point of proving beyond a reasonable doubt as in a criminal case, but more of evidence that bears the likelihood of the truth; the athlete gives more than not. Nonetheless, this standard is often demanding to apply in practice as it demands sportspeople to hold product packaging inspections, arrange batch screening, hire professional toxicologists, and, as a rule, finance litigation costs, which are not accessible to most sportspeople, especially non-elite and non-developed world athletes (Mazanov & Connor, 2010; Viret, 2016).

The CAS case law shows not only how hard such a standard is but also how determinative evidence is. In case CAS 2016/A/4534 (*Lawson v. IAAF*), American sprinter Jarrion Lawson was able to prove that his ingestion of trenbolone was a result of contamination due to beef through showcasing his dietary records, data on regional meat contamination and a history of negative doping tests (*Court of Arbitration for Sport, 2020*). On the other hand, in case CAS 2004/A/690 (*WADA v. Chamberlain*), the player did not demonstrate contamination of supplements because of the absence of stored samples of the products and records to support them, in spite of a consistent testimony (*Court of Arbitration for Sport, 2004*). In the same way, the panel in a case, CAS 2005/A/847 held that a non-verified allegation regarding supplement use lacking lab confirmation and traceability was not sufficient to meet the evidentiary threshold (*Court of Arbitration for Sport, 2005*). These results reflect a more fundamental institutional issue: that even though the formal standard of proof is still at the level of a balance of probabilities, the degree of scientific and procedural rigour actually required in practice may be in sympathy with stronger standards of proof. Such an approach has been criticized by legal scholars who claim that it is punitive in a disproportionate manner and undermines the playing field between doping athletes who have scientific and legal means of fighting doping and those who lack them (*Duval, 2017; Viret, 2016*). The evidentiary requirements in CAS jurisprudence, which strive to achieve fairness and deterrence, could collapse into the anti-doping regime as a whole because of penalizing athletes who were not able to prove their innocence, but those who intentionally violated the rules.

2.3. Imbalance of Legal Power

A critical concern in the adjudication of anti-doping disputes is the procedural imbalance that exists between athletes and regulatory authorities, specifically within sport tribunals such as the CAS. In contrast to the criminal courts, CAS and other disciplinary tribunals do not provide the full suite of procedural protections that are usually provided to defendants (*Ashworth & Zedner, 2008*). These rights are inherent incorporation principles, including a right to a hearing before a public court, provisions of innocence, the right to have a state-sponsored legal consultant, and stringent rules of evidence (*Benvenisti, 2008*). The CAS has been known to facilitate a faster resolution and more consistent outcomes when compared to domestic jurisdiction, but has been accused of structural biases in its operation concerning strict liability and lack of contextual awareness of socioeconomic disadvantage, among other factors (*Du Pisani, 2013; Duval, 2017; Star & Kelly, 2021*). One of the arguments made by scholars is that sport arbitration institutions are likely to act out of a presumption of guilt after the presence of a banned substance has been discovered, and hearing proceedings more usually work to the benefit of prosecution authorities like WADA and National Anti-Doping Organizations (NADOs) (*Viret, 2016*).

This already unbalanced position is further distorted by the limited capabilities

of certain national anti-doping organizations to offer athletes impartial or transparent appeal mechanisms. In some jurisdictions, especially those that do not have legal or institutional independent power, one cannot appeal against early punishments to a neutral tribunal (Akhtar, 2023). For instance, WADA's compliance monitoring has flagged numerous NADOs for failing to meet the procedural standard indicated in the International Standards for Results Management (Jann et al., 2017). The athletes in under-resourced areas have been disproportionately harmed because they are more likely to have no legal representation, scientific expertise and better acquainted with procedural defenses, which reduces their ability to navigate the complications of anti-doping adjudication (Star & Kelly, 2021). Such procedural asymmetry not only violates the principle of natural justice and the rule of fair play, but also raises questions about the originality of the outcomes of such tribunals in cases related to athletes or where they argue a case of unwitting consumption that results from contaminated supplements. Ever since legal scholars have reiterated the need to promote more procedural fairness and transparency in the system, the issue of overhauling the evidentiary, as well as adjudicatory standards in the global anti-doping framework, has become quite high on the agenda (Duval, 2017; Houlihan & White, 2003).

3. Scientific and Financial Barriers to Fair Defense

3.1. Proving Contamination is Technically Complex

Proving that the positive doping result is caused by supplement contamination is a scientifically complex thing, and to prove it, it is necessary to obtain and analyze a certain type of evidence and have access to the corresponding number of materials and tools that most athletes lack. The first task is for athletes to hold and release samples of supplements that were manufactured in the same batch where the contamination occurred. In the absence of it, the causal connection will hardly be possible (Viret, 2016). Second, the sample has to be analyzed in a laboratory recognized by WADA, where more sophisticated methods of analysis, including liquid chromatography-mass spectrometry (LC-MS/MS) or isotope ratio mass spectrometry (IRMS), are used to reveal the trace amounts of substances and differentiate between endogenous and exogenous compounds (Walpurgis et al., 2020). Nevertheless, the global distribution of WADA-accredited laboratories is rather unbalanced, and most of the Global South countries do not have laboratories, which means that athletes face extra logistical and financial costs (Pitassi & Lacerda, 2019). Further, the athletes more frequently need qualified toxicologists to interpret results and present the possibility to the adjudicating authorities something completely out of the reach of scientific literacy or economic capacity of most competitors (Thevis et al., 2021). Therefore, the evidentiary standard is technically strict, and structurally, it puts the athlete at a disadvantage despite the burden of proof lying with the athlete.

3.2. Financial Disparities and Access to Justice

The process of defending a doping case based on the grounds of supplement con-

tamination requires a substantial financial investment that is usually out of the range of non-elite or under-financed athletes (Striegel et al., 2005). Representation throughout the process of appeal before either the CAS or a national anti-doping tribunal is usually done by specialist law practitioners who are now experts in both sports law and scientific evidence (Star & Kelly, 2021). Such services undergo a fee structure, added to the expense of hiring expert witnesses; funding independent toxicology tests, and acquiring laboratory testing through WADA-approved labs, which can quite possibly surpass tens of thousands of dollars (Viret, 2016). Although professional athletes, including Olympic-level or federation-sponsored ones, can fund these expenses with the financial aid of an institution, grassroots athletes, especially those in developing countries, will have no access to financial assistance or support (Duval, 2017). The economic inequality leads to unequal access to procedural justice and makes the right to provide a credible defense dependent on wealth, whether of the individual or the institution. This state of financial inequalities leads to a deformation of the adjudicatory process because athletes who cannot afford to prove their innocence are more apt to take the sanction, although they might not have consumed a banned substance consciously (Star & Kelly, 2021; Viret, 2016). In that way, the anti-doping system, which is formally neutral, serves, in practice, to strengthen international inequalities in the availability of justice.

3.3. Resulting Inequities

The compounding of scientific and fiscal impediments in the determination of doping cases lay in the fabric of an inherently unequal system where (certain) individuals may not actually deserve the verdict due to their innocence as against the faculties that have access to legal recourses, technical facilities, and funds (Viret, 2016). Theoretically, the World Anti-Doping Code is applied equally in all jurisdictions, but in practice, athletes with low financial accessibility stand in a very uneven position when facing doping charges on the basis of contamination of supplements. Such a case can be taken as that of an American sprinter, Jarrion Lawson who was eventually absolved on establishing that his positive result was the result of eating contaminated beef and presented evidence of this claim through expert reports, dietary histories, and statistics of the risks of contamination (CAS 2016/A/4534) most athletes lack the means to present such an argument. In CAS 2004/A/690 (WADA v. Chamberlain), the fact that he had no samples of products used and could not finance the investigation made the account on the part of the athlete that he used them in good faith ineffective (Court of Arbitration for Sport, 2004, 2020).

A disproportionate group served the athletes of the Global South. The logistics and financial cost of transporting the samples to a WADA-accredited laboratory, liaising with an expert and seeking legal proxies can become insurmountable in countries that have no laboratory (Pitassi & Lacerda, 2019; WADA, 2021). In most of these occasions, athletes take a penalty on their part, not out of guilt but out of

a lack of money to dispute otherwise (Hiltzik, 2012). It leads to the actual division into the two levels of anti-doping justice, the one associated with the athlete who has a legal-scientific base, and the other with the athlete who has not (Star & Kelly, 2021). Strict liability, when imposed without proper procedural checks, can therefore be referred to as a tool for entrenching the set socio-economic inequalities in global sport (Matore, 2022). This deeply rooted asymmetry cannot be swept under the carpet by reforms because the absence of the same leaves the integrity of the anti-doping system weak, and any results might end up punishing the very circumstance instead of holding responsibility.

4. The Role of the Supplement Industry and Regulatory Gaps

4.1. Lack of Global Supplement Regulation

The entire DS market has been left relatively unchecked, which can be very dangerous to athletes, who, under the laws of strict liability, are bound by anti-doping laws (Van Thuyne et al., 2006; Walpurgis et al., 2020). In most jurisdictions, including the United States and much of the Global South, supplements are mentioned as food, not pharmaceuticals (Striegel et al., 2005). There are laws like the US Dietary Supplement Health and Education Act (DSHEA) of 1994 that do not obligate any manufacturers to prove their products are safe, effective, or pure enough to launch them to the market (Brownie, 2005). Such a laxity of regulations implies that supplements do not undergo universal tests to eliminate the presence of illegal substances contained in the list published by WADA and manufacturers do not necessarily apply to engage in cross-contamination of their products (Cordaro et al., 2011; Fink et al., 2019; Sagoe et al., 2014). The practices regarding the labeling can also be quite patchy since the fact that their products contained pharmacologically active compounds was undisclosed by the majority of products (Duiven et al., 2021).

The threat multiplies with the high use of supplements by athletes. Research confirms that over 50 percent of top sportspeople and leisure athletes use dietary supplements on a regular basis to improve their performance, recovery or health (Brennan et al., 2017). Nevertheless, the low traces of prohibited substances usually left by inadequate control can produce a positive result of doping even despite their low amounts, which are insufficient to produce effects on the organism (Coomber et al., 2014; Piacentino et al., 2022). It is also quite common that athletes incorrectly believe that any of the supplements bought in the market are free of harm; however, in the absence of regulation across the board or the mandatory work of third parties, this belief is wildly misinformed (Fabresse et al., 2021; Landy et al., 2017). The possibility of accidental doping exists even in countries where there are no WADA-accredited laboratories or regulatory enforcement agencies (Antonopoulos & Hall, 2016). As long as there are no harmonized international standards of quality control and safety testing of supplement production, there will be a threat of unintentional doping violations, which will disproportionately affect those athletes who use unverified or locally manufactured supplements.

4.2. Manufacturer Liability and Legal Precedents

Though the World Anti-Doping Code imposes strict liability on athletes for any prohibited substance detected in their body, the same cannot be said to be true of the supplement manufacturers (Geyer et al., 2014). There are extremely rare occasions when athletes have managed to sue companies into accepting legal responsibility for contamination. A particularly demonstrative case is that of a German footballer who sued a manufacturer of the supplementation product in which he tested positive for 19-norandrosterone (Striegel et al., 2005). The Stuttgart County Court ruled in his favor, and he was requested to be compensated on the grounds that the manufacturer had not met the basic quality control standards (Striegel et al., 2005). However, the case was resolved in an out-of-court settlement and both parties agreed on a sum of €36,000 (Striegel et al., 2005). Although this case established an important benchmark in terms of consumer protection in the use of supplements in sports, the case is an isolated one, far from being the norm.

In many jurisdictions, suppliers can do little legally to manufacturers because the regulators have classified supplements as food items and not medicines. Manufacturers will usually write broad disclaimers on their labels to shield themselves from liability, such as stating that their products are not meant to diagnose, treat or prevent any diseases as well as have vague warnings such as “may contain banned substances (Benardot, 2024).” These legal caveats and the cost of litigation discourage sportsmen and women from exercising civil law in such cases, especially where the case arises in a country where there is laxity of laws protecting the consumer (Rigozzi et al., 2015). Moreover, the commonly accepted rules of anti-doping imply that anti-doping sanctions will be imposed on the athletes even after the contamination has been confirmed, because the fact that a prohibited product was used does not depend on its purpose or the responsibility of the producers or sellers, but rather it is against the principle of strict liability (Matore, 2022). This consistent discrepancy and disparity push a disturbing inconsistency: athletes are suspended, their reputation and earning capacity ruined, whereas manufacturers are seldom questioned or punished by the regulatory agencies or sport organizations.

4.3. Third-Party Certifications: An Imperfect Solution

Following the outcry relating to the adulteration of dietary supplements, several third-party certification schemes have been developed and marketed to supply athletes with some form of consumer protection, certifying the purity and integrity of their supplements. Informed-Sport, Informed-Choice, and NSF Certified for Sport are among the programs that do testing associated with dietary supplements and their substances prohibited by the WADA Code (Lambert & Frenz, 2024). Such programs apply the independent laboratory analysis of products to the contamination and confirmation of good manufacturing practices (Lambert & Frenz, 2024). Authenticated items are then posted on searchable databases and athletes can select those that are less risky for doping. International Olympic

Committee (IOC) and other national anti-doping organizations have recognized the worth of these certifications to their harm reduction strategy (NSF International, 2018, 2022).

Third-party certifications are not an all-around solution to the problem, although they are a useful solution. To begin with, such programs are not universal and are concentrated in high-income countries. To get and to keep their certification, producers have to pay considerable fees, which smaller producers or producers in the region could not afford. This impediment of financial access limits the supply of medicines with certifications in most areas of the Global South, increasing current disparities regarding anti-doping insurance (Star & Kelly, 2021). In addition, there is no official endorsement of WADA on which certification body to use, and it is made clear that the use of certified supplements is not a guaranteed way to produce an adverse analytical result. This warning reveals one more constant loophole, though third-party software is more transparent and less prone to suspicion, it lacks legal protection in terms of sanctions. Therefore, despite the vital role of certification schemes as part of the risk management program, this tool cannot be used to overcome the fundamental structural and regulatory gaps driving athletes toward inadvertent doping.

5. Reforming the Burden: Proposals for a Fairer Anti-Doping Framework

5.1. Evidentiary Adjustments

The principle of strict liability consecrated in the World Anti-Doping Code imposes a heavy burden of proof on every athlete and, irrespective of this or that availability of scientific, legal or financing means (Du Pisani, 2013; Star & Kelly, 2021). Nevertheless, such a one-size-fits-all approach also does not consider the greatest differences in the capacity of athletes to provide a competent defense, especially in contamination, where a large amount of evidence needs high-level laboratory testing and understanding. By way of remedy to this systemic unfairness, we offer a graded evidentiary standard in supplement-related doping, whereby a burden of proof progressively increases as does the ability of an athlete to present it, depending on his competitive status (Viret, 2016).

In this model, less well-known or amateur players, who do not have the resources of training centers of national teams, institutional financial support and access to legal assistance, would then have to prove that their case has reasonable plausibility as opposed to meeting the standard of balance of probabilities. Such a reduced threshold would enable adjudicators to look into circumstantial evidence like the packaging of the product, its purchase records, etc., without requiring them to prove the claims beyond scientific doubt, which might not be possible. However, in contrast, high-level or funded sports people like those taking part in the Olympic Games or on national stipend would continue to be subject to the current balance of probabilities. The theoretical justification of such a differentiated approach is in the works on procedural justice that indicate that ensuring

justice in adjudication means being responsive to material inequalities (Star & Kelly, 2021).

This suggestion resonates with the initial arguments of scholars like Duval (2017), who have accused the unification of evidentiary standards in anti-doping law of being quite legally strict as well as ethically obtuse (Duval, 2017). Besides, it is able to lean upon similar models in criminal and civil legal cases, where evidentiary thresholds are adjusted to the needs of the case, and especially the protection of defenseless defendants (Teichman, 2017). Within the context of understanding that the structure of the global sport ecosystem currently contains structural inequalities, a tiered system boosts the substantive fairness and institutional legitimacy (Viret, 2016). Possible arguments against this are that a two-tier system of evidence would institutionalize a two-tier justice system, or that the classification of athletes (e.g. “amateur” v. “elite”) would be arbitrary. Nevertheless, these non-equalities already constitute themselves de facto, since access to legal representation, expert witnesses, and accredited laboratories for athletes is more frequently defined by socioeconomic status and institutional support. Recognition and a reaction to these material disparities do not jeopardize fairness, but instead affirm it. Context-sensitive standards of evidence are regularly employed by courts and administrative regimes to combat the problem of compounding disadvantage, especially within criminal and civil law systems in which the forces of equity have to compensate adverse effects of formal equality (Star & Kelly, 2021; Teichman, 2017). The proposal hence commends both practical necessity and principled procedural justice. Significantly, it does not release any athlete of culpability, yet acknowledges that procedural fairness ought to be adjusted to the conditions of unequal access to exculpatory evidence. In so doing, it transforms anti-doping enforcement into one that is not highly punitive but adopts the elements of proportionality and due process.

5.2. Supplement Traceability Systems

A transparent and verifiable supply chain has been a constant burden in the verification of contaminants in supplements. The evidence that is normally provided by sportspersons to show that a particular supplement has been contaminated is not batch-specific, as manufacturers do not have very good traceability practices (Cordaro et al., 2011). To serve it, an obligatory traceability system needs to be implemented that will oblige all sports-oriented dietary supplements to contain scannable QR codes with access to batch-specific laboratory results, sourcing of all ingredients, and audit results of any manufacturers (Adewale et al., 2025). Such QR codes would enable the sports people, anti-doping agencies and even shoppers to get instant information about whether a product has been subjected to independent testing to determine whether the product contains WADA-banned substances.

Additionally, a global registry with a central location could take the declarations of athlete supplements under the supervision of WADA or any other international

organization and compare them with flagged or approved batches. The new technologies, like blockchain, can make a significant difference as the additional provenance of the food, its origin up to the point of retail, could be presented as a tamper-evident blockchain (Kalaivani et al., 2024). By being combined with athlete declarations, such a system could create even more solid groundwork in case of contamination and decrease the gray area of the judicial process as well. It would present such a scalable solution to an effective procedural failure in anti-doping enforcement, as its implementation would entail international coordination. Besides safeguarding athletes, increased traceability would make the supply chain more transparent and, hence, regulating authorities, as well as the legal system, would be able to identify the source of adulteration or contamination. This might, in turn, create evidentiary foundations that would be critical in prosecuting negligent or fraudulent manufacturers under the consumer protection or tort laws.

5.3. Establishing a Global Supplement Safety Body

The regulatory and evidentiary gap that exists in the existing anti-doping context needs to be addressed by forming an independent global body whose mandate is to regulate the safety of dietary supplements in athletes (Antonopoulos & Hall, 2016). Compared to national regulatory bodies of variable strength and effectiveness as well as voluntary third-party testers, such an organization would have a central location that oversees safety verification of supplements, keeps an international list of brands deemed too risky or non-compliant, and sends prompt warnings to National Anti-Doping Organizations and the athletes. Its central activities would be performing random batch testing, accreditation of reputable manufacturers and having a centralized public list of approved products, and coordination with international laboratories and enforcement bodies.

One model of such a body would reflect the structures and systems already established in the pharmaceutical system, like the WHO Prequalification Program of medicines, assuring efficacy, safety, and quality of low-overhead market-based systems (Worku et al., 2012). Applying this reasoning to the supplement industry, the body would add to global fairness in anti-doping by immunizing sports stars against unwitting infractions that result from regulatory system breakdowns. It may also act as an impartial third party in supplement-related conflict, offering third-party certification to help settle the issue of contamination. That kind of initiative, supported by WADA and major sporting federations, could provide an institutional protection that is badly needed by the global population of athletes.

To address the differences in enforcement capabilities that are currently reported between various regions, this international safety authority must explicitly be tasked with liaising with the NADOs that lack adequate resources. This may include the provision of central testing results, issuing rapid contamination alerts and localized risk assessment tool development. By providing scientific and regulatory support to NADOs in the Global South, where many do not have access to

WADA-accredited labs or supplement batch-verification systems, the body would lower the weight of evidence restrictions on international athletes and potentially standardize supplement-related adjudication worldwide. Indeed, it would act directly in response to the geography of proof in Section 6.2, contributing to increased procedural fairness in the application of the law geographically and economically indifferently.

5.4. Legal Aid for Vulnerable Athletes

The strict liability applied in the global anti-doping framework is important in preventing the use of banned substances, but it puts excessive strain on athletes who have no means to oppose the charges that follow the contamination of supplements. Scientific defense requires a specialized legal team, laboratory testing with WADA accreditation, toxicology evaluation and evidence of expert witnesses, which are commonly unavailable to athletes working outside the top systems or in less privileged tracts. According to [Viret \(2016\)](#), the expenses regarding such a defense could reach up to thousands of dollars, not including the other costs, such as arbitration costs or the transport of a sample ([Star & Kelly, 2021](#); [Viret, 2016](#)). Such a financial obstacle is, in essence, a violation of procedural fairness in the anti-doping regime, because now the right of access to justice is restricted to implicit aspects of socioeconomic status and not merit or the truth ([Rigozzi et al., 2015](#)). With this deviation in mind, the establishment of Athlete Defense Funds is a reform that has to be made. This money, which could be under the control of international federations or national Olympic committees, would render financial and legal assistance to the athletes who have reasonable arguments about unintentional doping. There are already a few precedents, including the athletes' Anti-Doping Ombuds program that can be relied upon during Olympic games, but these are localized in time and space ([Duval, 2017](#)). Besides legal representation, NADOs must also be proactively involved in assisting good-faith scientific studies in cases of credibly alleged contamination, especially in supplement collection, third-party test organizations, and the referral of experts. Anti-doping integrity is not limited to detection and punishment, but is entailed by fair procedural protection ([Kambhampati & Star, 2021](#)). Justice will be ideal in the absence of institutional assistance.

6. Discussion

6.1. The Ethical Dilemma of Strict Liability

The doctrine of strict liability towards athletes with regard to any prohibited substance in their organisms, whether intentional or not, has been a staple of the anti-doping policing strategy towards deterrence and administrative convenience. Lately, however, with rising incidences of contamination of supplements, this value has become extremely questionable in terms of ethics. Even with due diligence, athletes are constantly exposed to products containing undeclared substances, thus making unintended violations possible. Although strict liability is

supposed to promote the integrity of sport, it can unintentionally penalize the innocent and destroy confidence in anti-doping organizations. According to [Viret \(2016\)](#), fairness should be a value within a disciplinary framework, especially one in which access to scientific and legal resources is not equal. In an environment where more than half of the athletes use supplements, strict liability threatens to be even more rigid in approach than procedural flexibility, which has a chance to become more about serving deterrence than about justice. It is high time, as well as morally not wrong, to review its application and scope once again.

6.2. Global Inequality in Anti-Doping Enforcement

The process of anti-doping enforcement is characterized by great disparities across different parts of the world that even scientists and researchers refer to as a geography of proof ([Efverström et al., 2016](#)). As is seen with athletes in Kenya, Nigeria, India, or Brazil, they rarely have access to a WADA-accredited lab, legal counsel, or any source of institutional funding to appeal an adverse analytical finding, particularly those attributed to a supplement tainted with an illegal substance ([Specht, 2014](#)). On the contrary, high-income countries such as the United States, the United Kingdom and Germany can better afford to hire expert toxicologists, get independent testing and seek appeals in the CAS. This institutional skew threatens the ethos of treating all similarly under the umbrella of the World Anti-Doping Code and potentially leads to unequal punishment of the athletes, depending not on the ground of guilt, but on the location and financial status. Unless efforts are made to align the access to resources and fairness of the procedures, the implementation of anti-doping ideology may become the driver of inequality in the world, instead of supporting universal principles of clean sport and human rights.

6.3. Risks of Doing Nothing

The long-term effect of ignoring the mounting danger of supplement contamination and its impact on the law can have a potentially ruinous effect on the anti-doping governance regime. With the increase in the number of people who became unintentionally doped, athletes are losing more confidence in the justice of the system, especially under the strict liability rule, which punishes the person who showed due diligence ([Du Pisani, 2013](#)). This trust decay can contribute to decreased compliance and cooperation with testing procedures, in addition to a chilling effect related to simplicity and candor in self-reporting by athletes ([Drake Jr, 2022](#)). Another cause of concern is that the high-profile cases resulting in unfair sanctions are a major issue and since they receive media attention and sympathy among citizens, it erodes the public trust in the anti-doping entities ([Drake Jr, 2022](#)). In addition, both outside anti-doping organs and supplement manufacturers also face an increasing amount of legal fodder helpfully supplied by the courts, who are increasingly willing to hear claims of both negligence and false sanction. Unless major reform is effected, the anti-doping system threatens to lose the con-

fidence of those it is designed to safeguard and invites itself to reputational, legal and institutional ruin. Doing nothing can no longer be a tactical middle ground, but a liability.

7. Conclusion

The increasing rate of polluted supplements raises an alarming issue regarding the authenticity and reasonableness of anti-doping regulations. Although the concept of strict liability has been crucial in ensuring that intentional doping is checked, its unflinching enforcement, particularly where the doping involved has either been inadvertent or because a banned substance has been ingested out of ignorance due to their mislabeling or contamination with other chemicals, will be detrimental to the integrity it is aimed at safeguarding. When athletes are not scientifically covered and financially competent to defend themselves, the sanction is not only the end of their career but also morally wrong. These problems are particularly sharp in conditions of poor resources where even access to a legal representation, WADA-approved labs or vetted supplements is not available or scarce. Reform must hence be imperative, not as a way of diluting the anti-doping regime but instead to make it more reasonable and plausible. There must be a refinement of the strict liability into context-specific nature of thresholds of plausibility and fault and mechanical systems of legal and scientific support should be developed. Of no less significance, international cooperation between WADA, national governments, regulatory agencies, and the supplement industry is necessary to set standardized safety precautions, enhance the level of traceability, and recognize high-risk products in their early stages. It is only through such reforms on a global scale and in a multi-lateral and flexible approach that the entire anti-doping system can save the very values of fair play and at the same time defend the rights of the innocent athletes.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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