DIETARY SUPPLEMENT SAFETY: RISK vs. REWARD for ATHLETES

By Tavis Piattoly, MS, RD, LDN

The dietary and sports supplement industry is an ever-evolving and growing industry that currently offers more than 55,000 supplements for consumers from which to choose. It is estimated the sports supplement market will generate more than $50 billion in revenue in 2019 with future forecasts projecting total revenues of around $90 billion by 2023. New companies and products are coming out every week, and it can be a challenge for health care practitioners who work with athletes to stay abreast of the types of products athletes are taking, as well as those that may pose a risk to their health or eligibility.

Protein and sports drinks continue to see growth in the sports nutrition sector while the use of pre-workout supplements have entered locker rooms at all levels, especially in high school athletics. It is estimated that 60 percent of athletes use dietary supplements.[1] A 2012 study of middle and high school students reported 34.7 percent of boys used protein supplements, 5.9 percent used steroids and 10.5 percent used some other muscle-enhancing substance.[2] Furthermore, a study of 37 public high schools in Wisconsin found 30.1 percent of high school football players reported using creatine.[3]

A Loosely Regulated Supplement Industry: Risk for Adulteration

The dietary supplement industry is loosely regulated and, by being so, supplement makers don't have to scientifically prove

the products they are marketing are safe before consumption. Furthermore, and even more concerning, they don't have to prove their products contain what is on the label. Because of weak regulations and lack of policy, supplements are at risk of becoming contaminated or adulterated with harmful ingredients. This can occur deliberately by the manufacturer (e.g., adding steroids to protein powder or banned stimulants to a pre-workout) or accidentally (e.g., cross contamination in the manufacturing facility). Brian Jordan, the certified for sport technical manager for NSF International, a product-testing organization, said many contaminated supplements can be attributed to the supply chain or poor manufacturing processes.

An example of cross contamination would be when a manufacturing facility makes a specific product, let's say a pre-workout supplement, and supplement company A wants it to contain the stimulant Synephrine, which is prohibited for use by the NCAA, MLB, NFL and several other professional sporting agencies. After finishing the production of the pre-workout, the manufacturing company doesn't clean the machine well and there are remnants of the pre-workout supplement left in the machine. Supplement company B has requested a pre-workout supplement without the use of stimulants. Since the machine was not cleaned well, the ingredients from supplement company A could be mixed with the ingredients from supplement company B causing cross contamination.

For collegiate, professional and Olympic athletes who are randomly drugtested, this could result in losing a year of eligibility (NCAA), a 50-80 game suspension (MLB) or a one- or two-year ban (Olympic) if testing positive for a prohibited substance. Since high school athletes are not tested for prohibited substances, there's a possibility they could be taking a dietary supplement with a prohibited substance and not know it.

Are You Doping and Don't Know It?

How many athletes are using prohibited substances and don't know it?

Three Clemson football players tested positive for Ostarine, a selective androgen receptor module (SARM) that is prohibited in all of sports, prior to the 2019 College Football Playoff National Championship game. SARMs are also marketed as dietary supplements through various channels and are being used at all levels of competition. In January, a North Dakota State fullback was suspended for testing positive for a banned stimulant in the pre-workout supplement he was using, which prevented him from competing in the FCS National Championship game. The player's mother claimed it was provided by the Bison staff, but the NCAA prohibits the distribution of dietary supplements containing stimulants, especially banned substances.

In 2018, 31 NFL players tested positive for a prohibited substance or drug. A Tennessee Titans offensive tackle tested positive for the SARM Ostarine on July 24. An Arizona Cardinals cornerback received a six-game suspension for testing positive for a banned substance earlier this year.

What's Really in Your Supplements?

The New York Times reported that 80 percent of herbal supplements evaluated from major retail stores didn't contain any of the herbs listed on the label. Furthermore, a popular store brand of ginseng pills only contained powdered garlic and rice.

A study in the *Journal of the American Medical Association* indicated that out of the 274 dietary supplements recalled between 2009 and 2012, 67 percent contained one or more pharmaceutical drugs in the product. This included drugs such as Viagra and the diet drug Meridia, which was pulled from the market because of heart attack and stroke risks.[4]

Jordan said stimulants found in pre-workout and weight loss supplements, along with sexual enhancement products, are the most common prohibited substances found in supplements they have tested in their lab.

"We're still seeing DMAA [dimethylamylamine], DMBA [dimethylbenzanthracene] and octopamine as the most common prohibited substances found in supplements," Jordan said.

Can You Trust the Supplement Store Staff?

Americans can be overwhelmed and intimidated when they walk into a supplement store or pharmacy due to the abundance of options. It's not uncommon for the average consumer to rely on the advice of a supplement store staff clerk. But rarely do these individuals have extensive dietary supplement education and understand the science behind the ingredients. They also may not be familiar with what products are third-party tested and free of banned substances.

Are we being misinformed and misguided by retailers? In a 2016 study published in the *Journal of Pediatrics*, lead study author Maguire Herriman set out to prove that we are. Herriman and his author team posed as a 15-year-old high school athlete and called 244 supplement stores across the country asking advice on what he could take to increase muscle strength.[5] Regarding availability for sale, 74.2 percent (181 of 244) of sales attendants stated a 15-year-old was allowed to purchase creatine, whereas 41.4 percent (101 of 244) stated one could purchase a testosterone booster.[5] Furthermore, 9.8 percent of the sales attendants recommended a testosterone booster, while 67.2 percent recommended creatine.[5]

Third-Party Supplement Testing and Certification

With an abundance of supplement brands and products on the market, the best way for a consumer to know if a supplement has been certified is to look for the mark of an independent, third-party testing organization. NSF International has been considered the gold standard in third-party testing, and many supplement companies have chosen NSF to test their products. NSF's testing program focuses primarily on the supplement manufacturing and sourcing process and provides key preventive measures to:

- Verify label claims against product contents
- Protect against the adulteration of products with prohibited substances
- Help identify substances banned for competition in the finished product or ingredients

When asked what makes NSF's dietary supplement testing program unique, Jordan said NSF International meets the dietary supplement industry's constantly evolving product and ingredient safety and quality needs through Good Manufacturing Practice auditing, accredited product testing and

certification programs and the NSF Certified for Sport certification.

"We are the only certification program recognized by Major League Baseball, National Hockey League and the U.S. Anti-Doping Agency," Jordan said.

This testing program not only keeps athletes clean and in the game, but also prevents adults from running the risk of taking a product that may contain an ingredient harmful to their health. To learn more about which products are third-party tested by NSF, visit **www.nsfsport.com.**

With the significant growth of dietary supplements, the risk for adulteration is more prevalent than ever. Athletes at all levels should take caution before ingesting a supplement without the advice of a trusted health care professional who is well versed in supplement safety and supplement science. Before using any dietary supplement, athletes should consult with their team sports dietitian or athletic trainer.

About the Author: *Tavis Piattoly, MS, RD, LDN, is the education program manager and sports dietitian for the Taylor Hooton Foundation. He travels the country to speak about the dangers of appearance and performance enhancing substances, dietary supplement safety and sports nutrition. He is also the co-founder and Director of Sports Nutrition for My Sports Dietitian (***www.mysportsd.com***) and the Eat 2 Win Nutrition App (***www.eat2win.online***). He currently serves as the sports dietitian and nutrition consultant for Fairchild Sports Performance in Houston and is an adjunct faculty member of Concordia University of Chicago's exercise science Department. He was the sports dietitian for the New Orleans Saints from 2006-13 and New Orleans Pelicans from 2008-13. He currently serves on the Science Advisory Board for Examine.com and Nordic Naturals.*

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