

PROJECT REVIEW

“Nicotine, Exercise and Heat Stress: Performance Benefits, Health Risks and Implications for the Prohibited List”

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In 2011 a study reported that of 2185 urine samples from professional athletes (spanning 43 different sport disciplines), ‘active’ consumption (not passive environmental exposure) of nicotine and/or tobacco-related alkaloids were detected in 15% immediately prior to and during sport practice. That same year WADA added nicotine to its Monitoring Program. Taken together, this highlights the extensive and alarming use of nicotine in professional sport.

Inclusion on the Monitoring Program implies nicotine satisfied three criteria of potentially i) enhancing performance, ii) representing a health threat for athletes and, iii) altering the spirit of sport. However, whilst evidence for the latter two criteria features in abundance the former criterion suffers from a lack of evidence or examination. To date, only two studies have investigated the effects of nicotine on sporting/exercise performance, with one showing an endurance improvement of 17% whilst the other found no effect.

However, evidence from similarly acting drugs such as bupropion and methylphenidate suggests that any performance improvements only occur at warmer ambient temperatures, when their action as central stimulants becomes more obvious. These substances also cause body temperature and heart rate to be pushed closer to the limit of safety.

Many competitive sporting events, especially endurance, take place during the summer period or in warm climates. Nicotine is known to reduce skin blood flow. When combined with exercise this raises a serious concern over the safety of its use during exercise/sport in a warm environment, where increasing skin blood flow and sweating are the primary routes of heat loss, possibly placing an athlete at greater risk of developing a heat illness.

This project will extend the limited data on whether nicotine does improve endurance performance, and determine whether at higher ambient temperatures nicotine may lead to developing heat illness, increasing an athlete’s health risk.