

## **Sport and dietary supplements: efficacy, safety and doping risk**

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A well designed diet that meet the energy and nutrient intake needs is the foundation upon which optimal training and performance can be developed. Consequently, athletes at all levels of competition continually work to improve performance, and many consider the use of dietary supplements to gain an additional performance edge or health benefit. The most common reasons for dietary supplements use include endurance capacity, maintaining muscle strength, improving energy metabolism and avoiding fatigue (Parnell 2015).

Athletes often experience significant internal and external pressures inspiring them to set high performance goals and they can be vulnerable to misinformation and risk in term of the safety, efficacy and legality of dietary supplements (Buell 2013). Although most supplements seem safe when using the recommended dose there are scientific evidence indicating that sport-people consume more than the recommended doses of some dietary supplements. Moreover, supplements that have been demonstrated to be safe when ingests on their own may have adverse effects when combined with other supplements.

Sport people includes individuals competing in a range of sport types, such us endurance, team, and strength and power. Optimized dietary supplements intake should take into account the type and intensity of the exercise, the individual characteristics (age, diet) and especially the safe dose of supplement to be used. However, only in few cases supplements claims are well related to aspects of exercise performance.

Creatine (CR) can be obtained on the diet or synthesized from the amino acids glycine, arginine and methionine, CR exists in free and phosphorylated forms, approximately 95% of the body's CR is stored in skeletal muscle, and it plays a role in ATP re-synthesis. CR is one of the main supplements used by athletes, often at high dose (5-10 g/day) for several weeks. Nevertheless a scientific panel of the European food safety agency has been established a cause effect relationship between the consumption of CR (3 g/ day) and an increase in physical performance during short-term, high intensity, repeat exercise bouts. On the other hand, no effect has been observed between the consumption of CR and an increase in endurance performance. Concerning micronutrients, a claim addressed to sport-people was related to vitamin C and the function of the immune system during and after intense physical exercise. In particularly, the evidences have shown that individuals exposed to brief periods of intense physical exercise and/or cold environments benefit in terms of duration and severity of the common cold from regular vitamin C intake (200 mg/day).

An emerging problem is the possibility that dietary supplements may contain undeclared substances, banned by World Anti-Doping Agency (Hon 2007). Contamination problem in supplements can be found in any country. It concerns all types of supplements and all forms (powders, pills, capsules). Scientific evidence has shown that contaminations can occur with a multitude of doping substances, and most likely with substances that are part of the groups of

anabolic agents or stimulants. Adulteration and contamination are risks to the athlete's health and eligibility because they may lead to unfavorable health outcomes and positive anti-doping test. To prevent "accidental doping", information regarding dietary supplements must be provided to athletes and coaches at all levels of competition. The risk of "accidental doping" via dietary supplement ingestion can be minimized by using "safe product".

In conclusion, additional research into the safety and the efficacy of dietary supplements in sport people is required. Furthermore educational programs are requires for the athletes and their personal trainers to ensure supplements are being used efficaciously to promote health and performance.

Buell (2013) J Athl Train 48, 124-136

Hon (2007) Br L Sports Med 41, 800-805

Parnell (2015) J Int Sport Nutr 12:49, 1-10