Summary of PARIS 24: At the Change Now Summit, Paris 2024 presents its catering strategy for the Games: combining French expertise and sustainable food. https://press.paris2024.org

Summary
At the Change Now Summit 2022, Paris 2024 President Tony Estanguet presented the Organising Committee's catering strategy for the Games. The ambition is at the height of the challenge with 13 million meals served during the Olympic and Paralympic Games and strong commitments that will guide their preparation. The Paris 2024 Organising Committee has worked with relevant stakeholders (from the agricultural and catering sectors, NGOs, experts, nutritionists, partners - Sodexo Live!, Coca-Cola - , athletes, chefs, etc.) to enhance French expertise and promote social and environmental practices that are more sustainable during the Games.

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Knowledge Transfer

Nowadays sustainable food is a common choice in urban areas of Western Europe, especially among highly educated young females. More and more athletes are switching to a vegetarian or vegan diet, and sports nutrition companies are slowly starting to provide some plant-based and vegan formulas. With the Food and Agriculture Organization (FAO) and the World Health Organization (WHO) having defined sustainable and healthy diets, the concept is no longer a hype. According to the FAO and WHO definition, sustainable healthy diets are dietary patterns that promote all dimensions of an individual’s health and wellbeing; have low environmental pressure and impact; are accessible, affordable, safe and equitable; and are culturally acceptable [1].

Even Public Health Ontario is a fan and describes it as a diet comprising a variety of primally fresh and minimally processed plant-based foods, sustainably produced vegetable fats, small amounts of minimally processed animal foods, tap water as the primary beverage choice, and very little wasted food [2]. Thus we can conclude that sustainable food encompasses 3 aspects: environmental, economic, and health. The most important question to ask as a sports dietitian is: Can we bring sustainable food to the sports world? Younger athletes in particular pay regular attention to sustainability. If athletes can achieve top performance on a plant-based diet, what prevents us from promoting such an approach there? Let’s look at the current scientific research.

Benefits of a plant-based diet and considerations for athletes

Performance impact

Avoiding meat, fish, and other animal products does not promote or hinder performance [3, 4]. This is equally true for endurance and power athletes [3, 5, 6, 14].

Vegan and vegetarian diets possess potentially disadvantageous properties for strength performance. However, research has failed to demonstrate consistent differences in performance and a trend towards improved performance after vegetarian and vegan diets for both endurance and strength exercise has been shown. Importantly, diet alters molecular signaling via leucine, creatine, DHA, and EPA that directly modulates skeletal muscle adaptation. By changing the gut microbiome, diet can modulate signaling in skeletal muscle through the production of short chain fatty acids [7, 8].

A plant-based diet may produce performance-enhancing effects for various types of exercise due to high carbohydrate levels and the high concentration of antioxidants and phytochemicals [9]. Well-planned vegetarian diets can provide sufficient energy and an appropriate range of carbohydrate, fat, and protein intakes to support performance. For example: a vegan diet eaten by CrossFit participants combined with high-intensity functional training positively affected strength endurance in the classic deadlift but is unlikely to be more beneficial in improving performance than a traditional mixed diet [10]. Thus plant-based diets are perfectly usable for the vast majority of athletes; but how about ultra-endurance athletes?

In Spain, the effectiveness of sustainable food was tested during an ultra-endurance running event called the ‘Indoor Everest Challenge’. This involved attaining the altitude of Mount Everest (8,849 m) in a simulated way without using ultra-processed food and wasting plastics. The single male athlete completed this challenge in 18 hours with low environmental impact. Despite only one athlete partaking in the challenge, this sports event had an educational component as it awakened curiosity about food sustainability [11].

Protein

Vegetarian athletes can meet their protein needs with predominantly or exclusively plant-based sources when a variety of these foods are consumed daily and energy intake is adequate. Plant-derived proteins are now also frequently applied in sports nutrition. So far we have learned that the ingestion of plant-derived proteins such as soy and wheat protein results in lower postprandial muscle protein synthesis responses when compared with the ingestion of an equivalent amount of animal-based protein. The lesser anabolic properties of plant-based versus animal-derived proteins may be attributed to differences in their protein digestion and amino acid absorption kinetics, as well as to differences in amino acid composition between these protein sources. Most plant-based proteins have a low essential amino acid content and are often deficient in one or more specific amino acids such as lysine and methionine. However, there are large differences in amino acid composition between various plant-derived proteins or plant-based protein sources. So far only a few studies have directly compared the muscle protein synthetic response following the ingestion of a plant-derived protein versus a high(er) quality animal-derived protein. The proposed lower anabolic properties of plant- versus animal-derived proteins may be compensated for by i) consuming a greater amount of the plant-derived protein or plant-based protein source to compensate for the lesser quality; ii) using specific blends of plant-based proteins to create a more balanced amino acid profile; and iii) fortifying the plant-based protein (source) with the specific free amino acid(s) that is (are) lacking [7].

Protein turnover studies suggest lower anabolic response after ingestion of plant versus animal proteins. However, a 12-week resistance training study showed that a high-protein (approximately 1.6 g/kg/day), exclusively plant-based (plant-based whole foods + soy protein isolate supplementation) diet is no different to a protein-matched mixed diet (mixed whole foods + whey protein supplementation) in supporting muscle strength and mass accrual, suggesting that protein source does not affect resistance training-induced adaptations in untrained young men consuming adequate amounts of protein [12].
However, muscle creatine stores are lower in vegetarians than non-vegetarians. Creatine supplementation provides ergogenic responses in both vegetarian and non-vegetarian athletes, with limited data supporting greater ergogenic effects on lean body mass accretion and work performance for vegetarians [13].

**Micronutrients**

The potential adverse effect of a vegetarian diet on iron status is based on the bioavailability of iron from plant foods rather than the amount of total iron present in the diet. Vegetarian and nonvegetarian athletes alike must consume sufficient iron to prevent deficiency which will adversely affect performance. Other nutrients of concern for vegetarian athletes include zinc, vitamin B12 (cyanocobalamin), vitamin D (cholecalciferol), and calcium.

Vegetarians have a higher antioxidant status for vitamin C (ascorbic acid), vitamin E (tocopherol), and beta-carotene than omnivores, which might help reduce exercise-induced oxidative stress. However, some plant-based foods also contain anti-nutritional factors such as phytate and tannins which decrease the bioavailability of key nutrients such as iron, zinc, and protein. Thus, plant-based diets must be carefully planned to ensure adequate intake and absorption of energy and all essential nutrients [9].

**Our role as sports dietitians**

The role of the sports dietitian with regards to sustainable nutrition is to disseminate scientific knowledge through platforms such as workshops or webinars to promote sustainable diet, influence sports catering policy, and participate in the sustainable food transition at policy level. All of the above is in connection with the EU Green NewDeal. Achievable key messages for athletes are:

- Were you aware that Sodexo will provide sustainable catering at the Paris 2024 Olympic Games [15], and have you heard of the EU food waste project ADVANCE [16] that is investigating food waste in all types of catering including sport clubs to develop strategies to minimize such waste?
- Time to cooperate on all aspects of sustainable food in sports.

**Disclosure Statement**

I hereby declare that there are no conflicts of interest with regards to this commentary.

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