

## SOY AND SPORTS NUTRITION

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Soy foods have the potential to provide many nutritional advantages, not only for elite athletes or individuals with active lifestyles, but also for people participating in every day recreational activity.

Recent research has investigated the potential benefits of soy protein for enhancing sporting performance in athletes. Most of the research in this area has been conducted with soy protein isolate, and indicates a role for soy protein in increasing the body's antioxidant status, reducing fatigue after exercise and minimizing tissue inflammation that occurs during exercise.

In addition, many soy foods provide nutrients that can play a role in sports performance, such as iron and certain amino acids.

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### **How does soy protein aid sports performance?**

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A person's ability to sustain high-intensity exercise is assessed by measuring 'VO2 Max', which is the maximum amount of oxygen taken up by a person exercising under a certain set of conditions. An improvement in VO2 Max is generally accompanied by an enhancement of physical strength and performance.

Dr. Husaini from the Nutrition Research and Development Centre in Indonesia<sup>1</sup> recently demonstrated that young male and female elite badminton players aged 10 to 14 years, given a soy protein-based, nutrient-rich beverage compared to a carbohydrate beverage control, had improved levels of VO2 Max and iron. The greatest improvement in VO2 Max was after four months of consuming the soy protein based beverage. The badminton players' improvement in VO2 Max was accompanied by an increase in physical strength and performance.

#### **Soy Protein: reduces fatigue after exercise**

Researchers from the Institute of Sports Medicine in Romania<sup>2, 3</sup> found that in Olympic athletes consuming a protein-rich diet, the use of soy protein may reduce fatigue after training sessions. Their studies with the Romanian Olympic Rowing Team showed that an intake of soy protein at 1.5g per kg body weight in addition to the regular intake of protein in the diet (2.0g per kg body weight) may be beneficial in reducing fatigue after an exercise session<sup>3</sup>.

#### **Soy Antioxidants: improving recovery**

The naturally occurring isoflavones in soy have been shown to act as antioxidants in the body<sup>4-8</sup>. Antioxidants are thought to 'neutralize' free radicals, which are unstable compounds that develop during normal metabolic processes and during periods of 'oxidative stress', such as exercise. These compounds may contribute to the fatigue, soreness and muscle injury that occurs with exercise<sup>5</sup>.

Dr. Robert DiSilvestro<sup>9</sup> from Ohio State University, USA, recently studied 20 healthy athletic college males who, in addition to their usual diet, consumed either 40 grams of soy protein with the naturally occurring isoflavones or 40 grams of whey protein as a control. The men consuming the soy protein showed an increase in their body's total antioxidant status (TAS), while the group fed whey did not experience any increase in TAS. This rise in the body's TAS was associated with a reduction in the level of certain enzymes in blood, which are indicators of muscle damage and inflammation. (Muscle damage and inflammation in athletes are a result of oxidative stress).

Dr. DiSilvestro noted that consumption of soy protein with its naturally occurring isoflavones may help protect the exercising individual against oxidative stress and resulting muscle injury and inflammation. Based on these research findings the routine use of soy protein in the daily diet may support long and hard training sessions, by shortening recovery time.

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### **Soy and Amino Acids**

Soy protein is a high quality protein comparable to milk protein. In addition to containing all of the essential amino acids (building blocks of protein) required by children over two years of age and adults, it contains several amino acids namely arginine and glutamine<sup>10</sup>, that are important for sports performance.

### **Soy and Arginine**

Arginine plays a key role in stimulating the release of hormones that promote muscle formation, and is required for the formation of a compound known as 'creatine phosphate', which is one of the most important sources of energy for muscles<sup>11, 12, 13</sup>. For athletes, arginine may play a key role in muscle formation, blood vessel health and in helping to maintain a strong and healthy immune system<sup>13</sup>.

### **Soy and Glutamine**

Glutamine is an amino acid that is considered essential during metabolic stress. Glutamine promotes protein synthesis and improves immune function<sup>12, 14</sup>. Even more important for the athlete, glutamine helps to maintain adequate hydration in cells and buffers the lactic acid that builds up during exercise<sup>15</sup>. These functions of glutamine help to support performance and recovery. Soy protein foods are also a good source of the amino acids leucine, isoleucine and valine, which are used as an energy source during exercise<sup>10, 16</sup>.

### **Soy and Iron**

Many soy foods provide significant amounts of the mineral iron, which is beneficial to exercise performance and general health. A common problem experienced by athletes is "sports anemia", which is believed to be due to intense training<sup>17-19</sup>, loss of iron via sweat and urine and the actual destruction of red blood cells with increased temperature and mechanical trauma caused by pounding of feet on running surfaces<sup>20-23</sup>. Female athletes have an even greater risk of "sports anemia" due to iron losses through menstruation. Recent studies have shown a beneficial role for soy protein when used as a supplement to improve iron status<sup>1</sup>.

<b>Food</b>	<b>Iron content (mg)</b>
Soy beans, cooked	3.7mg/cup

Tofu	3.1mg/cup
Soy milk	1.2mg/250mL
Soy flour	6mg/100g
Soy Protein*	18mg/100g

\*Soy protein is used in protein powders, sports bars and sports drinks

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