

**Myths and Misconceptions about Soy Protein  
For the Performance Nutrition Audience  
FINAL**

***Myth 1:***

***Soy protein is not a complete protein.***

**Fact 1:**

Soy protein is, in fact, a complete protein. Soy protein meets or exceeds the essential amino acid requirements for ages 2 years and older including children, adolescents, and adults.<sup>1-5</sup>

For individuals exercising, training and building muscle, soy protein can be used as a source of high quality protein to help satisfy the higher need for protein during muscle-building, and provide the necessary essential amino acids for physical and muscular development.<sup>6-12</sup>

People may be confused because many vegetable proteins are considered to be incomplete proteins – meaning that some key essential amino acids are missing or occur in levels too low to meet the body's needs. Without adequate amounts of all of the essential amino acids, the quality of a protein is limited.

This, however, is not the case for soy protein. Soy protein, has the essential amino acid profile which meets or exceeds that required for human growth, development and maintenance as recognized by the Food and Agriculture Organization of the United Nations (FAO)/World Health Organization (WHO) – the scientific agencies on human nutrition and health worldwide.<sup>1</sup>

***Myth 2:***

***Soy protein is an inferior protein because its Protein Efficiency Ratio (PER) or Biological Value (BV) values are not as high as in whey.***

**Fact 2:**

Soy protein is a high-quality protein equal to whey, egg or beef protein.<sup>1-3, 6-11</sup>

PER, BV and even NPU (Net Protein Utilization) are old measures of determining protein quality for humans. Alternatively, PDCAAS (Protein Digestibility Corrected Amino Acid Score) is the method recognized and implemented by many agencies, including the U.S. Food and Drug Administration (FDA) and the FAO/WHO, to determine protein quality of foods for human consumption.<sup>1, 13</sup>

PDCAAS is based on human essential amino acids requirements. Measures such as PER are based on rodent requirements for essential amino acids, which differ from human amino acid requirements. PER measures the ability of a protein to support the growth of young growing

rats, not humans. In the past the results of PER protein quality testing have been extrapolated to humans.

Alternatively, PDCAAS is based on the content of essential (or indispensable amino acids), protein digestibility, and the ability of the protein to meet human essential amino acid requirements. The standard, essential amino acid profile used in PDCAAS is for young growing children, two- to five-years of age, as determined by FAO/WHO/UNU (United Nations University). Why? Next to infancy, it is the most demanding period of human growth and development.

The highest possible PDCAAS a protein can receive is 1.0, which means the protein provides all of the essential or indispensable amino acids in the correct amounts and proportions for a two- to five-year old. Isolated soy protein, casein, whey, and egg white all achieve the PDCAAS of 1.0 (beef receives a 0.92 because it is limited in tryptophan).<sup>2</sup>

Why do people continue to cite old methods and measurements? Perhaps it's due to lack of knowledge in the protein metabolism field. As it relates to performance nutrition, progressive exercise physiologists, nutritionists and coaches are aware of the PDCAAS method to determine protein quality of a food. This has helped create a better understanding of soy protein quality and the benefits of soy protein.

***Myth 3:***

***Soy protein does not have the key amino acids needed for muscle building.***

**Fact 3:**

Soy protein contains all of the key or essential amino acids for muscle building, plus two amino acids known to enhance immune function – arginine and glutamine.<sup>2, 14-16</sup> Both arginine and glutamine, although produced in the body, at times during stress may be produced in lower quantities. It is known that these amino acids help in muscle building<sup>17</sup> and help to support immune system health. A value of soy protein (when compared to animal-based proteins) is that it contains higher amounts of glutamine and arginine. In fact, soy protein isolate contains almost three times as much arginine and almost twice as much glutamine as whey.<sup>2, 15</sup>

Soy protein isolate has comparable amounts of the branched chain amino acids (leucine, isoleucine and valine) as animal-based proteins.<sup>2</sup> These amino acids may play a key role in muscle building, may help to prevent central nervous system fatigue,<sup>18-22</sup> and can serve as an energy source during long periods of aerobic exercise.<sup>20</sup>

A key performance benefit of soy protein isolate is that it contains a high concentration of the amino acids necessary for performance and recovery. The term Critical Cluster™ describes the combination of naturally occurring glutamine and arginine, as well as leucine, isoleucine and

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valine (the branched chain amino acids) in isolated soy protein.<sup>23</sup> Soy protein isolate has a higher amount of Critical Cluster amino acids compared to the content in beef, whey, casein or egg.<sup>2, 23</sup>

And soy protein also contains all of the essential amino acids required for growth and maintenance.

***Myth 4:***

***Soy protein is a soft protein; whey protein is a strong protein.***

**Fact 4:**

Amino acids from proteins, regardless of source, will be used by the body for building muscle and delivering energy in exactly the same way. Therefore, there are no “soft” or “hard” proteins. Soy protein is a high quality protein, equal to meat, milk, and eggs. As a plant-based high quality protein, soy protein provides all of the essential amino acids to support muscle building, performance and recovery.

This myth implies that soy protein does not have the “muscle” to provide the necessary amino acids needed by body builders and athletes to deliver energy and develop muscle. Such beliefs were likely predicated on the old PER and BV values for protein quality measures. Soy protein’s quality PDCAAS score of 1.0 (equal to casein, whey and egg) and the presence of key amino acids – glutamine, arginine, and branched amino acids – dispel this myth.<sup>2, 15</sup>

In addition, the body cannot tell the difference between the sources of the protein - vegetable or animal. If there is something significantly limiting in a protein source, such as essential amino acids, the body will not respond as efficiently to exercise. A protein’s source does not affect the method by which the body uses amino acids to build muscle and deliver energy. Therefore, classifying a complete protein as “hard” or “soft” is incorrect.

***Myth 5:***

***Soy protein does not build muscle like whey.***

**Fact 5:**

Soy protein is a muscle-building protein.

Whether from soy, casein, whey or egg, a complete protein provides the body with the elements from which to build muscle or deliver energy. Soy protein contains the required levels of essential amino acids in addition to glutamine and arginine.<sup>2, 15</sup> In fact, soy protein isolate contains almost three times as much arginine and almost twice as much glutamine as whey.<sup>23</sup>

Suggestions that soy protein builds lean muscle while whey protein builds muscle mass, again, do not make sense. A protein that has all the essential amino acids and is digestible is used to

develop a lean muscle structure or a structure with higher proportions of muscle mass when combined with muscle building exercise. Type of exercise, such as endurance and strength training, will impact the body's dietary protein needs. In addition to type of exercise, dietary protein requirements for exercise also depend on exercise intensity, as well as the age and gender of the exercising person.

They have been used and promoted extensively in the marketplace (almost exclusively) in recent years and many body-building consumers have utilized whey products, creating an association between building muscle mass and consuming whey.

***Myth 6:***

***Soy protein has feminine hormones and will detract from the hormonal balance of testosterone.***

**Fact 6:**

No body of research exists linking the consumption of isoflavones (compounds in soy protein that often are labeled as phytoestrogens) to an altered testosterone level in men. A series of studies of Olympic athletes who consumed soy protein showed blood biochemistries, blood hormone levels (including serum testosterone), estrogen and thyroid hormones to remain within normal limits.<sup>24-30</sup> And the large numbers of children and adults who have consumed soy-based infant formula, as well as Asian males who eat sizeable quantities of soy protein, have normal hormonal balance, normal sexual development, and normal virility.

Additionally, preliminary research suggests that a diet rich in soy protein, with naturally occurring isoflavones, may have several health benefits for men. Studies suggest that soy protein may be helpful in promoting healthy weight loss when individuals are consuming a reduced calorie intake.<sup>33-35</sup>

Numerous studies also reveal that eating a diet rich in soy protein has several heart health benefits.<sup>36</sup> The body of evidence led the Food and Drug Administration to approve a heart health claim around soy protein in 1999.<sup>32</sup> And preliminary research links regular consumption of soy protein to a reduction in the risk of prostate health issues, including prostate cancer. Clinical studies currently are underway to further explore the effects of soy protein as it relates to prostate health.

***Myth 7:***

***Soy protein is a woman's protein.***

**Fact 7:**

Preliminary research suggests that a diet rich in soy protein, with naturally occurring isoflavones, may have several health benefits for men.

Numerous studies reveal that eating a diet rich in soy protein has several heart health benefits. The significant body of evidence led the Food and Drug Administration to approve a heart health claim around soy protein in 1999.<sup>32</sup> And clinical studies currently are underway to further explore the effects of soy protein as it relates to prostate health.

As it relates to performance nutrition, there is a misconception that soy is not a high quality protein or that it does not have key amino acids to build muscle. (See fact 4.) Another misconception is that because soy contains isoflavones, it is anti-male or a more feminine product. (See fact 6.) Soy protein has a PDCAAS of 1.0, the critical cluster amino acids, and provides health benefits for both men and women.<sup>14,15,23,36</sup>

***Myth 8:***

***Soy protein causes excess flatulence and disrupts the stomach.***

**Fact 8:**

Soy protein isolate is gentle on the stomach and is formulated to not cause the flatulence associated with whole bean soyfoods.

Soy protein isolate is processed into a highly digestible form. It has a digestibility value of 97% or higher. Soy protein isolate is used to feed infants (soy-based infant formula) and is found in foods eaten by young children.

In some cases, soy protein processing technology may produce products that cause flatulence and stomach distress. Specific soy forms (e.g., soy flours) contain a significant amount of carbohydrates similar to those in other beans, which can cause gas. Such carbohydrates are relatively hard to digest and can cause gas and stomach issues. However, other soy products such as isolated soy protein have very little carbohydrate (less than 3%). Therefore, they do not disrupt the digestive system.

It also is important to note that not all soy ingredients are created equal. Soy flours contain 50% protein, soy concentrates contain 70% protein, and isolated soy proteins contain more than 90% protein on a dry weight basis. Therefore, soy flours generally contain approximately 40-45% carbohydrates, soy concentrates 18-20% carbohydrates, and isolated soy proteins around 3% carbohydrates.

It makes sense to investigate the source and ensure that you use a form of soy (such as isolated soy proteins) that promotes easy digestion.

***Myth 9:***

***Soy protein does not have the muscle recovery power of whey.***

**Fact 9:**

Recent studies have demonstrated that *SuproSoy*<sup>®</sup> brand soy protein with higher levels of isoflavones (The Solae Company) has stronger recovery benefits compared to whey in exercising adult males.<sup>37</sup>

In a recently published study, Dr. DiSilvestro showed, in young males undergoing strenuous aerobic exercise to the point of exhaustion, soy protein with higher levels of isoflavones provided increased overall antioxidant status and a lower rise in plasma creatine kinase and myeloperoxidase versus whey protein. The enzymes are indications of muscle tissue breakdown and inflammatory oxidant stress, respectively. The results indicate that soy protein with higher levels of isoflavones may produce stronger antioxidant effects than whey, particularly with exercise-induced oxidant stress.

Additionally, Dr. DiSilvestro has conducted two additional recovery studies in male and female weight lifters eating soy protein versus whey.<sup>38</sup> The initial findings suggest similar results – soy protein with higher levels of isoflavones provided an increased antioxidant status, reduced plasma creatine kinase, and lower levels of plasma myeloperoxidase versus whey. Plasma creatine kinase may be used as an indicator of muscle breakdown after exercise. Plasma myeloperoxidase may be used as a measure or marker of muscle inflammation.

Other human performance studies support soy protein's potential muscle recovery benefits compared to their typical diets.<sup>24-30,37,38</sup>

These findings may help athletes in diversifying their protein intake to include soy protein before and after exercise as part of their training program.

***Myth 10:***

***Soy protein is not as quickly digested as whey and, therefore, is not as rapidly/quickly absorbed into the blood stream to help in the process of building muscle.***

**Fact 10:**

Soy protein is a highly digestible protein, and is readily absorbed.

Isolated soy protein is 97 to 99% digestible. And soy protein has the highest PDCAAS (1.0) for a protein, which measures digestibility and availability of essential amino acids.<sup>1, 13</sup> Muscle and recovery benefits were demonstrated in studies with male and female Olympic athletes consuming soy protein as a supplement in the daily diet compared to their typical diets. Adding the performance beverages to diets resulted in a potential for decreased fatigue and faster recovery. In addition, the recent series of oxidative stress and recovery studies at Ohio State University with recreational male and female athletes in both the strength and endurance categories showed isolated soy protein to be more effective than whey.<sup>37, 38</sup>

***Myth 11:***

***Soy protein negatively affects those who have breast cancer.***

**Fact 11:**

Actually, research suggests a link may exist between consumption of soy protein and a reduction in the risk of breast cancer. An epidemiological – or population – study of Asian-American women (high soy consumers) shows a lower risk of breast cancer compared with those who were low soy consumers.<sup>40, 41</sup> A number of laboratory studies found that feeding animals a diet rich in soy protein inhibits cancerous tumor development.<sup>42-45</sup> Other studies indicate consuming soy during adolescence may reduce the incidence of breast cancer later in life.<sup>39, 46</sup>

Research is ongoing to further determine the specific effects of soy protein as it relates to breast cancer.

***Myth 12:***

***Soy protein negatively impacts thyroid function.***

**Fact 12:**

Available data from many intervention studies reveal that soy intake does not adversely affect thyroid function in humans. In fact, a series of studies of Olympic athletes who consumed soy protein showed blood biochemistries, blood hormone levels, estrogen and thyroid hormones all remained within normal limits.<sup>24-30</sup> Interestingly, a recent population-based study conducted by the Northern California Cancer Center with the University of California School of Medicine found that consumption of traditional and nontraditional soy-based foods was associated with a reduced risk of thyroid cancer.<sup>47</sup>

***Myth 13:***

***Hardcore athletes would reject soy protein.***

**Fact 13:**

The fact is that most hardcore athletes (body builders) see soy protein as a good or excellent source of protein. National consumer research studies looking at the hardcore athlete in body building contests support this assertion. In fact, 63% of male body builders and 67% of female body builders rated soy protein as a good or excellent source of protein. When asked if they would consider diversifying their current protein source with another protein if it could provide additional performance benefits or additional health benefits, the response was above 94% agreement for both men and women body builders. When asked specifically about a diversified approach using soy protein as one source (in addition to other proteins) for short-term performance and long-term disease fighting properties, both men and women body builders

indicated positive purchase intent (70% for men; 76 % for women). The bottom line is that even the most hardcore body-building athletes are open to soy protein.

Statistics indicate that roughly 30% of body builders or hardcore athletes would use only whey or egg protein. This is quite understandable given the industry's predisposition to whey and egg sales over the past 10-15 years. The counter fact is that 7 out of 10 (roughly 70%) of these top athletes are open to soy protein. And, as more information and research show positive effects in performance and health, acceptance and use will continue to grow.<sup>48</sup>

***Myth 14:***  
***Soy protein has an unpleasant or "beany" taste.***

Fact 14:

Soy protein produced by the Solae Company can be found in a variety of great-tasting, everyday foods. Specifically, soy protein produced by The Solae Company is carefully processed to preserve the high-quality protein content, while at the same time removing the carbohydrate portion of the soybean that is often responsible for the negative flavors associated with soy products. Consumers can look for foods and beverages made with Solae soy protein to ensure they are getting not only high-quality soy protein, but also great tasting soy foods and beverages.

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