

# Egg Protein in Sports Nutrition

Protein consumption continues to be a global trend, becoming more than just a part of regular meals. Protein has become a staple for those looking to build muscle or quick recovery after exercise. Innovation around high protein products such as snack bars and protein powders has made it easier for athletes and exercise enthusiasts to consume adequate protein. Eggs are an easy and affordable way to increase protein in a diet.

## Eggs are the Gold Standard

Eggs are known as the gold standard for measuring protein quality. One whole egg provides 6 grams of protein with only 70 calories.

Protein quality generally refers to how well the body is able to use a specific protein. Protein quality also includes how well the essential amino acid profile in a protein matches the body's requirements, how well the body is able to digest the protein, and the bioavailability of the amino acids<sup>5</sup>. High quality proteins such as eggs allows for rapid recovery post-exercise. High quality proteins provide the secondary amino acids particularly the BCASSs necessary for muscle synthesis. A diet rich in animal proteins, such as eggs, allows for greater net protein synthesis compared to vegetable based proteins<sup>1</sup>.

Eggs are given a protein digestibility score of 97%, contain all essential and non-essential amino acids and have an overall PDCAAS score of 1.00, exceeding other popular protein sources such as meat, fish, and soybeans.

The idea that eggs are high in cholesterol and saturated fat and are poor for heart health no longer remains to be true. The American Heart Association has announced that consuming eggs has no ties to increased cholesterol or cardiac consequences.

## Proteins in Sports Training

The availability of dietary protein is widely considered to be necessary to support optimal lean muscle growth during periods of strength training. Scientists and athletic trainers are in agreement that proteins are the building blocks of muscle and are necessary for muscle growth and repair. The presence of adequate dietary proteins during training can help facilitate and support improvements in strength<sup>1</sup>. An athlete that adds egg whites to their diet is consuming both a high quality protein while reducing or limiting total dietary fat intake.

A single egg white provides 3.5 grams of protein and only 15 calories. Consuming egg whites in a egg white protein

powder can provide up to 25 grams of protein per serving with minimal calories and fat. This would be equivalent to eating 7 egg whites, all in the convenience of an easy-to-drink shake format.

Combining multiple egg whites with one or two whole eggs still cuts fat intake while maintaining taste, and provides a higher amount of protein. Consuming egg protein after a workout can allow for optimal protein absorption<sup>5</sup>.

## Suggested Amount of Protein

TYPE OF ATHLETE	HABITUAL g/lb	DIETING g/lb.
Male Strength/Power	1.1-1.4	1.4-1.5
Female Strength/Power	1.1-1.2	1.2-1.4
Male Endurance	0.7-0.9	0.9-1.0
Female Endurance	0.6-0.7	0.75-0.9

## Complete Amino Acid Profile

Eggs provide all 9 essential amino acids (EAA) as well as 9 non-essential amino acids. The presence of all 18 essential and non-essential amino acids is one of the features that makes eggs a high quality protein. EAAs are necessary for muscle protein synthesis. Eggs provide more EAA (as a percentage of protein) than any other animal protein. EAAs are required to stimulate protein synthesis, whereas nonessential amino acids play a supportive role.

Since eggs provide all EAAs and they are a high quality protein, they are valuable to the synthesis and maintenance of muscles<sup>1</sup>. It is believed that amino acids can help prevent muscle fatigue, improve workout performance, boost recovery and help define and build muscle mass.<sup>3</sup>

The anabolic effect of exercise is increased when amino acids and protein are consumed together.<sup>1</sup>

AMINO ACID	EGG
Histidine	22
Isoleucine	54
Leucine	86
Valine	66
Lysine	70
Methionine Cysteine	57
Tyrosine Phenylalanine	93
Threonine	47
Tryptophan	17



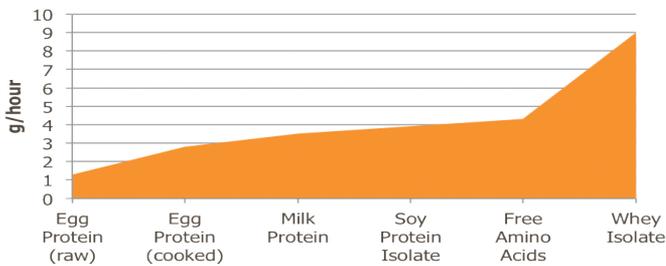
Eggs are rich in the EAA leucine. Adding leucine in an athletes' diet can be advantageous to someone undergoing endurance training. Leucine is a key to muscle protein synthesis and optimizing muscle mass. Leucine is the EAA credited for muscle recovery after exercise.<sup>1</sup>

### Slower is Better

Eggs have a slower absorption rate compared to other popular proteins. Perception has been that “faster is better”, however scientific research shows that this isn't always true. Slower absorbed protein allows for better protein anabolism, providing between 4 to 9 times more protein synthesis than with free amino acids or a fast absorbing protein such as whey protein alone.<sup>2</sup> This can be an optimal approach for allowing lean muscle growth. Slowly absorbed amino acids, such as those in egg protein promote leucine balance, better than a fast absorbing protein or amino acids alone. Consuming a slow absorbing protein such as eggs would be ideal after exercise or training.

While fast absorbing proteins allow for rapid release of amino acids into the bloodstream after exercising, fast absorbing proteins are not the optimal choice for lean body mass gains<sup>1</sup>.

**ABSORPTION RATE**



### Complete Nutrition

Eggs are known for having a high Protein Efficiency Ratio (PER), Biological Value (BV), Net Protein Utilization (NPU), and Protein Digestibility Corrected Amino Acid Score (PDCAAS), out-ranking beef, chicken, and soy.

NUTRITION	EGG	BEEF	CASEIN	WHEY	SOY
PER	3.9	2.9	2.5	3.2	2.2
BV	100	80	77	100	74
NPU	94	73	76	92	61
PDCAAS	1.00	0.92	1.00	1.00	1.00

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### Biological Value

Biological value represents the actual amount of protein deposited per gram of protein absorbed. High BV proteins are ideal for nitrogen retention, immunity, and are better for reducing lean tissue loss from various wasting states. A protein with a high BV is ideal for strength training.<sup>4</sup> The best way to increase skeletal muscle protein anabolism is to consume a high-biological value protein with each meal. Eggs have a ranking of 100, the highest on the Biological Value scale.<sup>1</sup>

### Protein Efficiency Ratio

Protein Efficiency Ratio measures the gain in body weight divided by weight of protein consumed. Proteins with high PERs assist with quality muscle growth after exercising. A PER that is higher than 2.7 is considered to be a high quality protein. Eggs have a Protein Efficiency Ratio of 3.9, outranking other major protein sources such as beef, casein, and whey.

### Net Protein Utilization

Net Protein Utilization represents the percentages of a food protein retained, the amount of protein eaten compared to the amount of protein retained. NPU and BV rankings are very similar, however NPU compares the amount of nitrogen retained to the amount ingested. A perfect NPU is given a ranking of 100. Eggs have a Net Protein Utilization score of 94, even outranking whey protein.

### Protein Digestibility Corrected Amino Acid Score

PDCAAS is a fairly recent new method of analyzing protein quality. It rates protein relative to a give reference protein. PDCAAS factors in digestibility of a specific protein, providing more accurate relevance to the amino acid profile. The highest value a protein can receive on the PDCAAS rank is 1.00<sup>5</sup>.

### Chemical Score

A chemical score is ranked based on the essential amino acid levels in a protein. It is calculated by choosing a protein as a reference and other proteins are ranked compared to the chosen protein. Egg protein is used as the standard for ranking other proteins on this scale.

1. Egg Protein as a Source of Power, Strength, and Energy : Nutrition Today. (n.d.).  
 2. "Issues of Dietary Protein Intake in Humans" Bilborough and Mann, 2006 pg. 137  
 3. The Personalization of Protein. (2014). Acosta Sales & Marketing, 12.  
 4. Egg Protein as a Source of Power, Strength, and Energy : Nutrition Today. (n.d.).  
 5. McDonald, L. (2007). The Protein Book (1st ed., p. 12, 45, 46, 51, 56, 120, 134). Salt Lake City, Utah: Lyle McDonald Publishing.

