

Whey Protein Isolate (WPI)

Amino Acid Profile	Pre-Workout	Post-Workout	Between Meals	Before Bed
High quality whey protein isolate is produced using cross-flow microfiltration (CFM), a process that retains a superior amino acid profile in the end product. It contains an abundance of eight essential amino acids (EAA) including an exceptionally high level of branched chain amino acids (BCAAs).	WPI's absorption rate makes this form ideal as a pre-workout supplement. Consuming as little as 20 grams before a workout will ensure there's an abundance of important BCAAs supplied to your body throughout your training session, thus maintaining a state of anabolism and attenuating catabolism.	Studies indicate the rate which amino acids enter the blood increases immediately after a session of resistance training, therefore driving an anabolic (muscle building) environment in the body. WPI ingestion has been shown to cause hyper aminoacidemia (a rush of amino acids into the blood stream) after exercise, leading to elevated protein synthesis. The only better choice is whey protein hydrolysate (see next section) because of its even faster rate of digestion.	WPI can be categorized with a medium digestion speed, thus making it the ideal daytime protein supplement, especially between meals. Its high bioavailability delivers muscle building proteins to feed muscle tissue and its easy absorption minimizes feelings of fullness and bloating. By adding WPI to your between meal shakes, you can meet your muscle needs without the risk of feeling overly full for your next meal.	The amino acids in WPI are absorbed at a rate of about 8-10 grams per hour. If you consume 40 grams before bed, you'll be feeding your muscle only for about four hours while you sleep. Although this time frame isn't terrible, micellar casein offers more hours of muscle food over the course of the night because of its slower absorption rate (see micellar casein section)

✓✓✓✓✓

✓✓✓✓✓

✓✓✓✓□

✓✓✓✓✓

✓✓✓□□

Whey Protein Hydrolysate (WPH)

Amino Acid Profile	Pre-Workout	Post-Workout	Between Meals	Before Bed
High quality products use advanced enzymatic degradation and thus retain the same superior amino acid profile of the WPI starting product (with eight essential amino acids (EAAs) and high levels of BCAAs).	The rapid and easy absorption of WPH make this form a great choice before training. Studies have shown that sustaining high levels of amino acids in your bloodstream while working out promotes greater muscle growth and faster recovery.	WPH remains the ultimate post work out protein supplement. Depending on the level of hydrolysis. WPH absorbs much faster than any other source of protein, thus fostering a greater anabolic environment in the body. In addition since it is predigested (via the processing technique), users notice very little stomach discomfort or bloating, which means you probably won't have any issues eating a whole-food soon after ingestion of WPH.	WPH is not the best protein powder to take between meals because it gets released into your system too quickly and it has a fast absorption rate. Since you're looking to fuel your body with protein during this time period, you'll want a powder that will sustain amino acid delivery for 2-4 hour. Furthermore, because WPH is the most expensive type of protein supplement, you would be wasting extra money to take this form at a time when it isn't used optimally.	Before you turn in for the night you'll want to give your body the best ammo possible to stave off catabolism while your sleep. Cortisol is a "stress" hormone that is detrimental to the training athlete. WPH is the exact opposite of what you need in a pre-bedtime protein shake because it's so rapidly shuttled into your blood stream. For best results stick with a slow-absorbing protein (e.g. micellar casein), as this type of protein will help sustain amino-acid levels in your body through the night.

✓✓✓✓✓

✓✓✓✓✓

✓✓✓✓✓

✓✓□□□

✓□□□□

Whey Protein Concentrate (WPC)

Amino Acid Profile	Pre-Workout	Post-Workout	Between Meals	Before Bed
WPC has a robust amino-acid profile with eight essential amino acids and a large amount of BCAAs. The fact that it goes through less processing means the whey retains more of its native structure and thus offers a wider range of health benefits. However, you must keep in mind you are obtaining less protein scoop for scoop with this particular protein powder (as a result of the "extra" components within the powder - lactose and fat)	WPC can be categorized as having a medium absorption rate, a speed considered sufficient for a preworkout protein supplement. Keep in mind, however, that the fact and lactose in WPC may cause bloating or stomach discomfort when taken before physical exertion - both of these side effects could negatively impact your training session.	Studies demonstrate the rate at which amino acids enter the blood after a period of resistance training amps up the degree of anabolism in trained muscle, and amino acids from WPC enter the blood quite rapidly. Again here, as with WPI, the only better choice is whey protein hydrolysate because it has an even faster rate of absorption.	WPC is a beneficial option between meals. The additional calories contained in this supplement provide a boost for those with an ecto-morphic body type (i.e. naturally skinny, lean and smaller framed), hardgainers and athletes who are trying to put on some weight. If you want to use WPC as a between-meals source of nourishment, be aware that WPC has a substantially higher calorie content than WPI, so the protein shake could leave you feeling pretty full. Don't let the shake take the place of a meal, and keep track of your total caloric intake to make sure you are not getting too much excess from shakes with WPC.	With its medium absorption rate, a WPC shake before bed is an acceptable choice. But be forewarned, the extra calories ingested from fat and lactose, which are not ideal right before sleep, can be converted and stored as bodyfat.

☑☑☑☑☑

☑☑☑☐☐

☑☑☑☑☐

☑☑☑☑☐

☑☑☑☐☐

Micellar Casein

Amino Acid Profile	Pre-Workout	Post-Workout	Between Meals	Before Bed
A high-quality micellar casein product will be produced by cross-flow microfiltration (CFM), which preserves the many subfractions and growth factors known to give this protein its anti-catabolic properties. This superior form of casein protein has an impressive amino-acid profile that includes high amounts of BCAAs.	During the preworkout window, your body requires fast-digesting proteins to ensure high levels of amino acids are circulating in your blood for the workout ahead. Because micellar casein has the slowest absorption rate of all protein products, it's a much less effective choice as this time compared to whey powders. If you were to use micellar casein in your preworkout shake, your muscle tissue would be a risk of catabolism because the aminos are not reaching the bloodstream fast enough.	Micellar casein's remarkably slow release of amino acids into circulation also makes it a mediocre post workout choice compared to whey sources of protein. After your training session your muscles are looking for immediate nourishment if sufficient aminos are not readily available, your body will start breaking down muscle tissue to get the fuel it requires. Research has definitively shown faster absorbing proteins promote greater anabolic responses immediately after exercise (for up to two hours post-workout)	This distinct protein source is considered an effective type of protein to consume between meals, as its slow absorption and high bioavailability provide protection against catabolism for the hours from one whole-food meal to the next.	Before you retire for the night, micellar casein is without doubt the number 1 protein supplement. Drinking a shake mixed with just 30 grams of micellar casein has been scientifically demonstrated to promote a seven-hour sustained flow of blood amino acids, leading to the highest muscle nitrogen retention and use in its class. In one particular study, the slow and steady absorption of this protein reduced catabolism by 34% for seven hours after digestion.

☑☑☑☑☑

☑☑☐☐☐

☑☐☐☐☐

☑☑☑☑☑

☑☑☑☑☑

Egg Protein (albumin)

Amino Acid Profile	Pre-Workout	Post-Workout	Between Meals	Before Bed
Egg protein boasts a good amino-acid profile with all of the essential and sulfur-bound amino acids. This form of protein used to be considered the best product available but has been surpassed by whey powders, as they contain much better amino-acid profiles (e.g. Cross-Flow Microfiltration-CFM whey has about twice as much Leucine as egg albumin).	Egg isolates digest at fast-to-medium speed, so they elevate amino-acid levels in the bloodstream at a moderate rate. Studies show 25-30 grams of egg albumin will provide a boost to blood amino acids for approximately 2 - 3 hours, which is an ideal time span for preworkout use. If you want to use egg albumin before training, just be aware this protein form may cause bloating and gas, two unpleasant side effects that could hinder your workout.	When matched up against WPI and WPH, egg protein comes up short as a post-workout protein source. This form simply doesn't stack up to the superior amino-acid profile found in whey products.	Egg protein is an ideal supplement for shakes between meals. Products of this type are affordable and provide an adequate source of absorbable protein. Furthermore, the medium range digestion time is ideal for bridging the gap from meal to meal.	Egg albumin's moderate absorption rate means it won't allow for a steady release of amino acids into your bloodstream for the duration of your sleep. Therefore, it isn't a good bedtime option because this form won't provide adequate protein nutrition throughout the night.

✓✓✓□□

✓✓✓□□

✓□□□□

✓✓✓✓✓

✓□□□□

Soy Protein

Amino Acid Profile	Pre-Workout	Post-Workout	Between Meals	Before Bed
As a plant protein, soy's amino-acid profile doesn't stand up to that of other sources mentioned in this article. Some high-quality soy products contain as much as 90% protein but have a low biological value (BV) - a measure of bioavailability. Moreover, this protein form has a low amount of cysteine (a conditionally essential amino acid) and contains a number of protease inhibitors (proteases are very important for protein absorption and the inhibitors severely interfere with proper absorption).	Based on its weak amino-acid profile and biological value, as compared to other forms, soy protein isn't recommended as a preworkout supplement. It lacks the appropriate nutrients and rate of absorption to benefit your body and muscle tissue leading up to and during a workout.	The lower biological value makes soy a questionable source of protein after training. The lack of scientific support for soy as a muscle building supplement suggests that you're better off choosing a form with proven muscular benefits after training.	Unless you're vegan, there are better options to keep your body fueled with protein between meals.	Again, because other protein types have so much more to offer in terms of amino-acid profile, biological value and slow-absorption rate, soy isn't considered adequate as a bedtime supplement.

✓✓□□□

✓□□□□

✓□□□□

✓✓□□□

✓□□□□