

## **Product: Enigma**

**Class:** Intra-workout/post-workout BCAAs and recovery formula

**Flavors available:** Pineapple and Passion Fruit

**Serving Size:** 30 servings

**Product Summary:** Branch Chain Amino Acids (BCAAs) are made up of three essential amino acids; Leucine, Isoleucine, and Valine. They are essential because the body cannot produce them from other amino acids, meaning they must be ingested via food or supplements. Enigma contains additional Leucine to create a 3:1:1 ratio of Leucine: Isoleucine: Valine. Additionally, we have added 5 of the 7 major electrolytes to support the intra-workout use of Enigma. Properly dosed glutamine and creatine HCl have also been added to support Enigma's post-workout recovery use.

### **Ingredient Details:**

**L-leucine (3,600mg)** is one of the three BCAAs and is sometimes referred to as the 'main' amino acid since the most popular benefit of BCAAs (muscle building) is primarily due to leucine. Leucine is an activator of the protein known as mTOR, which induces muscle protein synthesis. The studies assessing leucine mostly look at muscle protein synthesis when additional leucine is added to the diet or to a test meal, and it appears that leucine is able to reliably increase muscle protein synthesis after test meals.

**Isoleucine (1,200mg)** in relation to the other two BCAAs is intermediate for its ability to induce muscle protein synthesis (stronger than valine, but much weaker than leucine). Isoleucine is able to significantly increase glucose uptake and usage during exercise. However, isoleucine does not promote glycogen synthesis. Isoleucine can be seen as the BCAA which mediates glucose uptake (into a cell) and breakdown (into energy) to a larger degree than other amino acids and may serve as a performance enhancer.

**Valine (1,200mg)** is one of the BCAAs alongside leucine and isoleucine. It seems to be more similar to leucine than to isoleucine, but the transient state of insulin resistance occurs faster than with leucine (isoleucine causes glucose uptake) while the muscle building effects of valine are likely less than both leucine and isoleucine.

**Glutamine (5,000mg)** has a variety of functions in the body. It helps repair and build muscle, fuel the cells that line the intestines, and is an important component of the body's immune response. Many athletes take glutamine because excessive exercise depletes glutamine stores, and glutamine supplements are thought to speed up recovery times, prevent muscle wasting and make it easier to build and maintain muscle mass. Athletes who train for endurance events (like marathons) may have reduced amounts of glutamine in their bodies; it is common for them to catch a cold after an athletic event. Some experts think that may be because of the role glutamine plays in the immune system.

**Creatine HCl (2,000mg)** works well because adding the hydrochloride group to the creatine molecule lowers the pH of creatine, making it more acidic. This drastically increases its solubility in fluids. Research shows that when subjects consume the same amounts of creatine HCl and creatine monohydrate, the creatine HCl is absorbed by the intestines around 60% better than creatine monohydrate. This means that a much smaller dose of creatine HCl is needed to get similar results to a bigger dose of creatine monohydrate. With greater solubility in fluid, greater absorption by the intestines and with a much smaller dose, the chance of stomach issues and subcutaneous water retention are significantly reduced.

**Betaine Anhydrous (1500mg)** is essential to the maintenance of intestinal function and cell production. It may help support kidney health, and it may also function as an antioxidant. Betaine has also been suggested to support plasma methionine and S-adenosylmethionine (SAM) levels under certain conditions. As a nutritional aide, betaine anhydrous has been suggested to be lipotropic (i.e., fat-loss supporting) by promoting the oxidization of lipids. It has also been noted to increase appetite, improve digestive efficiency, and in animals it has been suggested to promote lean mass.

**L-Carnitine L-tartrate (2,00mg)** is often used as a brain booster due to its ability to increase alertness and mitochondrial capacity while providing support for neurons. Carnitine has been shown to be very effective at alleviating the side effects of aging, such as neurological decline and chronic fatigue. Carnitine supplementation is also a very safe method of improving insulin sensitivity and blood vessel health, particularly for people with delicate or weakened cardiac health. Carnitine can protect neurons and repair certain damage, such as that caused by diabetes and diabetic neuropathy. Researchers found carnitine supplementation led to 55% less muscle glycogen usage, 44% lower muscle lactate and other changes that resulted in improved exercise performance. Lactate is an enzyme that accumulates during exercise and can lead to fatigue, while glycogen is a storage form of sugar. These results suggest carnitine supplementation elicits changes associated with better exercise performance.

**Taurine (1,000mg)** improved exercise performance when given to trained athletes. Cyclists and runners were able to cover longer distances with less fatigue. Taurine also has a role in reducing muscle damage; participants placed on a muscle-damaging weight lifting routine found that it helped reduce markers of damage and muscle soreness. In addition to these performance benefits, it may have benefits for weight loss by increasing the use of fat for fuel. Cyclists supplementing with 1.66 grams of taurine increased fat burning by 16%. In human studies, taurine removes waste products that lead to fatigue and cause the well-known “muscle burn” and protect muscles from cell damage and oxidative stress, thus increasing fat burning during exercise. In animal studies, taurine has been shown to increase the muscle’s ability to contract and produce force, causing muscles to work harder and for a longer duration of time with reduced fatigue and muscle damage.

**Bioperine® (5.3mg)** helps increase the bioavailability of supplemental nutrients by enhancing absorption.

**Calcium DimaCal® dicalcium malate (95mg)** is one of the 7 major electrolytes and is a crucial mineral for bone health as well as metabolic functions all over the body.\* Because bone is constantly remodeling, or rebuilding itself, a steady supply of calcium is needed to keep it strong.\* DimaCal is a highly bioavailable form of calcium. In fact, comparative research has shown that DimaCal is better absorbed than calcium carbonate, calcium citrate, and microcrystalline hydroxyapatite.

**Potassium Citrate (80mg)** is one of the 7 major electrolytes and helps maintain the levels of water in the body, and can assist the body by converting excess blood sugar into glycogen. This is an extremely important benefit to athletes and weightlifters. Whereas sodium is mainly found outside cells, potassium is the major positively-charged ion (cation) inside cells and is hugely important for regulating heartbeat and muscle function. It forms the other half of the electrical pump that keeps electrolytes in balance and allows conductivity between cells, also making potassium a critical part of neuron transmission. Potassium citrate promotes kidney health and helps reduce the possibility of kidney stones. Kidney stones can be caused by increasing levels of calcium in the body, or acidic urine. In addition, potassium citrate can help maintain a healthy heart.

**Sodium Chloride (51mg)** is one of the 7 major electrolytes and is an essential electrolyte for humans; sodium is responsible for controlling the total amount of water in the body. It is also important for regulating blood volume and maintaining muscle and nerve function. Sodium is the major positively-charged ion (**cation**) outside your body cells and is mostly found in blood, plasma, and lymph fluid. This creates one-half of the electrical pump that keeps electrolytes in balance between the intracellular and extracellular environments (i.e., sodium outside of cells and potassium inside).

**Magnesium (28mg)** is one of the 7 major electrolytes and may be the most under-appreciated mineral in your nutritional arsenal. Not only is it necessary for over 300 biochemical reactions in the body, but it also plays an important role in the synthesis of both DNA and RNA, essential to every cell of every known living organism. The fourth most prevalent mineral in the human body, magnesium helps maintain normal nerve and muscle function, boosts the immune system, maintains stable heart rate, stabilizes blood sugar, and promotes the formation of bones and teeth. Nuts, spices, leafy green vegetables, coffee and tea are all generally good sources of the mineral.

**Phosphorus (48mg)** is one of the 7 major electrolytes; health benefits include healthy bone formation, improved digestion, regulated excretion, protein formation, hormonal balance, improved energy extraction, cellular repair, optimized chemical reactions, and proper nutrient utilization. The health benefits of phosphorous make it an important constituent of any diet. Phosphorus is essential for proper functioning of human bones, meaning that it would be impossible to function normally without an adequate amount of this mineral in the body. In fact, phosphorus is regularly noted as the second most profuse mineral in the human body, and is the second most important element when it comes to maintaining bone health and integrity, behind calcium. Apart from providing strength to bones and teeth, other health benefits of phosphorus are essential for performing essential activities for different body parts like the brain, kidney, heart and blood.