BCAA
Branched Chain Amino Acids

Ingredients
Doctor’s Best Branched Chain Amino Acids (BCAAs) refers to the essential amino acids: Leucine, Isoleucine and Valine. These amino acids are considered essential because they cannot be synthesized by the body, therefore they must be obtained through dietary intake. BCAAs can be found in many protein sources, such as milk, meat and eggs, but these sources may not provide an optimal amount of these essential amino acids. BCAAs have been shown to be vital for muscle protein synthesis. BCAAs act as constitutive proteins for the building of muscles, but more importantly, their presence activates signaling pathways for muscle growth1, 2, 3. Supplementation of BCAAs prevents fatigue during exercise by attenuating the decline of circulating levels of BCAAs, a process which can result in fatigue. BCAA supplementation has been shown to improve athletic performance during both strength and endurance exercises, as well as increase preferential loss of body fat4, 5, 6, 7.

Benefits
Stimulates Muscle Growth*  
Prevents Muscle Breakdown*  
Helps Prevent Exercise-Induced Fatigue*  
Increases Preferential Loss of Body Fat*

The primary mechanism through which BCAAs stimulate muscle growth is by activating the protein mTOR, mammalian Target of Rapamycin. The mTOR signaling pathway is responsible for cellular growth, and most importantly, muscle protein synthesis. Muscle protein synthesis stimulated by the mTOR protein enhances muscle repair and hypertrophy1. This muscle protein synthesis is stimulated by the presence of Leucine, independent of the presence of any other amino acids. This was shown in a study in which researchers fed 25 healthy males a complete balanced diet, inducing hyperaminoacidaemia, an excess of amino acids in the blood stream. Only half of the subjects were supplemented with Leucine in addition to their diets; muscle fractional synthesis rates were shown to be significantly higher in the group that received the additional Leucine. This demonstrated that supplementation of one of the Branch Chained Amino Acids, Leucine, improves muscle protein synthesis independent of the presence of other amino acids8.

Other Ingredients: Soy lecithin.
Suggested Adult Use: Dissolve 1 scoop of powder in a small amount of water or juice. Add an additional 6 - 8 oz. of liquid, mix well, and drink before exercise. Repeat after exercise, or before bed, or as recommended by a nutritionally-informed physician.

Contains Soy
Non-GMO and Gluten Free
Store in a cool dry place.
NOTE: Some settling of contents may occur, affecting number of servings.

BCAA Powder
Supplement Facts
Serving Size: 1 scoop (5 grams)  
Servings per container: 60 servings  
<table>
<thead>
<tr>
<th></th>
<th>Amount per serving</th>
<th>% Daily Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>L-Leucine</td>
<td>2.5 g</td>
<td>†</td>
</tr>
<tr>
<td>L-Isoleucine</td>
<td>1.25 g</td>
<td>†</td>
</tr>
<tr>
<td>L-Valine</td>
<td>1.25 g</td>
<td>†</td>
</tr>
</tbody>
</table>

† Daily Value not established.

BCAA Capsules
Supplement Facts
Serving Size: 1 capsule  
Servings per container: 240 servings  
<table>
<thead>
<tr>
<th></th>
<th>Amount per serving</th>
<th>% Daily Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCAA Blend</td>
<td>500 mg</td>
<td>†</td>
</tr>
<tr>
<td>L-Leucine</td>
<td>250 mg</td>
<td>†</td>
</tr>
<tr>
<td>L-Isoleucine</td>
<td>125 mg</td>
<td>†</td>
</tr>
<tr>
<td>L-Valine</td>
<td>125 mg</td>
<td>†</td>
</tr>
</tbody>
</table>

† Daily Value not established.

Other Ingredients: Modified cellulose (vegetarian capsule), microcrystalline cellulose, magnesium stearate (vegetable source), silicon dioxide.
Suggested Adult Use: Take 1 capsule, up to 3 times daily, before or after physical exercise, or as recommended by a nutritionally-informed physician.
Non-GMO and Gluten Free
Store in a cool dry place.

* These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure or prevent any disease.
Another major mechanism by which BCAAs can increase muscle mass is by attenuating muscle breakdown as a result of exercise. Muscle proteolysis, or breakdown, has been shown to be suppressed simply with BCAA supplementation, independent of any action by insulin\(^7\). Serum BCAA levels can be depleted and BCAA catabolism can be increased as a result of intense exercise\(^13, 14\). The best way to combat the muscle breakdown, muscle fatigue, depletion of serum BCAAs and the delayed onset muscle soreness from intense exercise is to supplement with BCAAs\(^15, 16, 17, 18\).

BCAA supplementation has been shown to improve sports performance: these improvements in sports performance have been demonstrated with a variety of mechanisms over many studies measuring sports related variables. In 2007, researchers conducted a study in college males to see how BCAA supplementation affected markers of muscle damage, perceived exertion and leg strength following exercise, compared to either carbohydrate or placebo supplementation. Following the exercise, the group that received BCAA supplementation showed lower levels in both of the measured markers of muscle damage, a lower rate of perceived exertion and better performance on the strength test compared to the groups that received either placebo or carbohydrate supplementation\(^21\).

In a study that examined two groups performing squat exercises over three days and received either carbohydrates or BCAAs, at a dosage of 5.5 grams. The group that received the BCAA supplementation maintained their performance throughout the study better and had less muscle soreness than the group that received the carbohydrate supplementation\(^22\). In a study comparing elite competitive wrestlers on a hypocaloric diet, the group that received BCAAs were able to maintain their high level of performance while inducing significant loss of visceral adipose tissue, body fat, as compared to groups receiving either high or low amounts of protein and the control group\(^21\).

Endurance performance was significantly improved in runners that received BCAA supplementation when trained participants competed in a 30-km cross-country race or a marathon. The runners that received BCAAs had more significant improvements in run times and less mental fatigue after the races compared to the placebo group\(^22\). Drinking BCAAs has been shown to enhance exercise capacity and increase lipid oxidation in individuals that have depleted muscle glycogen stores as a result of exhausting exercise\(^23\).

Branch Chained Amino Acids are an essential part of a healthy diet. BCAA supplementation, in combination with exercise, has been shown to improve sports performance through a variety of mechanisms. BCAAs have also been shown to help in improving body composition. The recommended dosage for Doctor’s Best Branch Chained Amino Acids is 5 grams daily.

### Scientific References


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