Research article

Available online at: www.ijpir.com

International Journal of Pharmacy and Industrial Research

Issn Print 2231 – 3648
Online 2231 – 3656

AMINOPOWER POWDER : Loaded with power of essential Aminoacids for Muscle repair & strength& to boost recovery after musculoskeletal injury or surgery or trauma.

Govind Shukla, C. Subrahmanyam, V. Preethi, V. Chaitanya kumar, Mantipally Yamuna, C.J Sampath Kumar
Lactonova Nutrition Research centre Hyderabad
A Unit of Lactonova Nutripharm (P) Ltd, 81/3, IDA Mallapur, Hyderabad, Telangana, India-500 076.

ABSTRACT

The term "branched chain" refers to the molecular structure of three particular amino acids – leucine, isoleucine, and valine – and plays an important role in protein synthesis. Muscles have a particularly high content of BCAAs, making up approximately one third of skeletal muscle in the human body.
BCAA's are currently used clinically to boost recovery after musculoskeletal injury or surgery. Scientists have known that individuals suffering from physical trauma need to rapidly manufacture new body tissues while making sure that any cells not affected by the injury remain healthy and viable. To quickly create new tissues, the body uses amino acids to assemble mint-condition proteins that will be the foundation for new muscles, tendons and ligaments. Clinical studies have shown that branched-chain amino acids have a special capacity to boost protein synthesis and inhibit protein breakdown that none of the other amino acids have, A protein containing essential amino acids is known as a "complete protein". If one or more of those amino acids are missing, it is known as an "incomplete protein". Aminopower powder containing essential amino acids thusit is known as a "complete protein supplement''This review summarises the current available scientific literature regarding the effect of **AMINOPOWER POWDER,**Loaded with power of essential Aminoacids **to** Stimulate Protien synthesis & for Muscle repair & strength**.**

Keywords; AMINOPOWER**, E**ssential Aminoacids**,**Stimulate Protien synthesis,Muscle repair & strength**.**

INTRODUCTION

The body makes millions of new proteins every day to replace worn-out proteins that make up connective tissue, red blood cells and muscles. During exercise, muscle tissue is being broken down at a high level and additional protein building blocks, known as amino acids, are needed to make repairs and stop small injuries from becoming major ones. Long protein chains made from these amino acids make up the basic structural unit of a collagen fiber. Collagen fibers give connective tissue its tensile strength; a load of at least 22 pounds is needed to break a one mm (in diameter) cell fiber.
There are two types of proteins – animal proteins and vegetable proteins. Animal proteins include milk protein (or "complete milk protein"), which has both casein and whey together. Casein protein prevents muscle breakdown, whereas whey protein builds muscles. Whey is easy to digest, absorbed more quickly than casein and is therefore the animal protein of choice for injuries. Vegetable proteins include soy protein (excellent for recovery), rice protein and legumes such as beans. Rice and beans are not a complete source of protein,

Author for Correspondence:
Govind Shukla
Lactonova Nutrition Research centre Hyderabad
A Unit of Lactonova Nutripharm (P) Ltd, 81/3, IDA Mallapur, Hyderabad, Telangana, India-500 076.

meaning that they do not contain all the essential amino acids, but in combination they become complete. Soy protein is the only vegetable source of complete protein.

Branched Chain Amino Acids (BCAAs)

The term "branched chain" refers to the molecular structure of three particular amino acids – leucine, isoleucine, and valine – and plays an important role in protein synthesis. Muscles have a particularly high content of BCAAs, making up approximately one third of skeletal muscle in the human body. BCAA's are currently used clinically to boost recovery after musculoskeletal injury or surgery. Scientists have known that individuals suffering from physical trauma need to rapidly manufacture new body tissues while making sure that any cells not affected by the injury remain healthy and viable. To quickly create new tissues, the body uses amino acids to assemble mint-condition proteins that will be the foundation for new muscles, tendons and ligaments. Some studies have shown that branched-chain amino acids have a special capacity to boost protein synthesis and inhibit protein breakdown that none of the other amino acids have. Indeed, Clinical study trials have suggested that BCAA supplementation, in addition to post-exercise carbohydrates, attenuates muscular damage during prolonged endurance exercise and reduces post-exercise CPK (creatine phosphokinase – a marker of muscle breakdown) activities as well as DOMS.

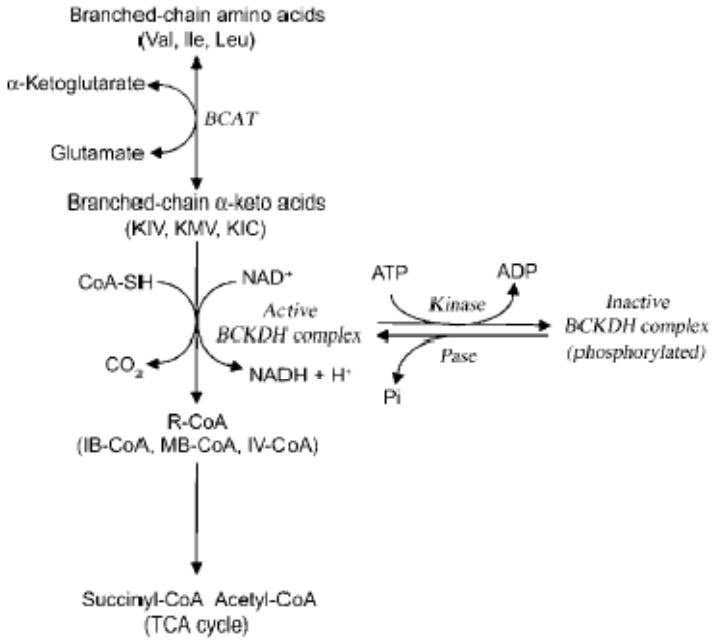

FIGURE 1 The first two steps in the BCAA catabolic pathway.

The Basics of Protein

Proteins are often referred to as the "building blocks" of the body, and for good reason. Unlike other macronutrients that can be "turned over" internally, there needs to be an incoming supply of this raw material in order to make up amount lost through the process of degradation. Since the body cannot store the individual amino acids that make up proteins, it collects them in and exchanges them among the liver, the blood and in the spaces surrounding individual muscles fibers, known as interstitial spaces.

Structure of Protien

Amino acids rarely serve a function on their own and are most often put to work in combinations. From a chemical standpoint, all of them contain an amino group (NH_2) with an acid end (COOH), as well as some component that sets them apart from each other. Some of these latter components include glucogenic groups, some contain sulfur and there are some that are known as branched-chain aminos based on their chemical structure. There are 21 unique amino acids present in the human body, ten of which are essential for bodily function in adults and cannot be synthesized by the body.

These are:

- Phenylalanine
- Valine
- Threonine
- Tryptophan
- Isoleucine
- Methionine
- Histidine
- Arginine
- Leucine
- Lysine

As a practical matter, histidine and arginine are required by infants and growing children. The amino acids leucine, isoleucine and valine are believed to account for approximately 60% of muscle tissue. Consequently, it is believed that it is these amino acids that are most readily taken up and converted into catalysts, sparing other amino acids in the process for use in protein synthesis and in energy production.

A protein containing essential amino acids is known as a "complete protein". If one or more of those amino acids are missing, it is known as an "incomplete protein".

While many people are concerned about the ratio of complete proteins in their meals, or the ratio of complementary proteins, it is important to realize the body can draw from a pool of amino acids within a given muscle.

Exercise Duration & Catalyst Depletion

If a given exercise lasts too long, the supply of ready formed catalysts is exhausted and the cells turn to converting amino acids that had been destined for use in protein synthesis. This is because the catalyst function is necessary for survival, while protein synthesis can wait, as far as the body is concerned. So the amino acids that have already been absorbed in the tissues are the first up for use as catalysts. In the event that there is an insufficient amount of amino acids, it is the muscle tissue itself that will be used through a process known as gluconeogeneis. From a training perspective, this constitutes overtraining and is generally to be avoided.

Avoiding Catalyst Depletion

Perhaps the easiest way to sidestep the issue of catalyst depletion altogether is ensure that he or she consumes an adequate amount of calories every 3 to 4 hours. Since the body's "go-to" source of energy is carbohydrates, it is important that he or she consumes an amount of carbohydrate to spare protein.

In addition to nutritive considerations, the workout itself should not overly exertive. This will allow for the availability of sufficient post-workout recovery catalysts and energy being the process of anabolism in which the body grows new cells and maintains tissues, and slows the process of continued catabolism, or tissue breakdown.

Valine, leucine, and isoleucine make up the three amino acids known as branched-chain amino acids (BCAAs). BCAAs are critical to animal development and tissue synthesis, and are primarily found in plant sources in the animal diet. [1] These three amino acids are part of the essential amino acids. This means that either our bodies cannot produce them, or that they cannot be produced in sufficient amounts in the body. Thus, they must be obtained through the diet. Humans cannot produce BCAAs, even in insufficient amounts and must get them through the diet. [1]

With the current research on genetically modified organisms (GMOs), there has been a lot of effort towards producing plants with higher concentrations of BCAAs. [1] Parallel to this research is the idea that with so much emphasis on athletic performance in today's sports, increasing the nutritional value of foods could be a huge breakthrough and perhaps make healthier food options cheaper and more obtain able to athletes.

BCAAs After Exercise

A common practice in the bodybuilding is the ingestion of BCAAs or a fast-acting protein supplement with a simple sugar such as dextrose or fructose immediately after exercise. This explains the relationship between leucine and insulin release and its role in muscle protein synthesis.

Clinical study reports on BCAA

A study by Winik, Chmura, Wojciech Ziemba, Mikulski, and Nazar was performed on a sport which requires interval changes or rapid bursts of all-out effort. Soccer, football, bodybuilding, power lifting, basketball, baseball, and many other contact sports have similar paces of play and bursts.

Players were given a placebo or BCAA complex and were subject to two 45 minute interval workouts between walking and running. After each workout, the subjects took a multiple choice test for 15 minutes then did an active recovery for 20 minutes. Their multiple-choice reaction time (MRT) was calculated after each workout and recovery time. The MRT for the placebo treatment was slightly higher than the BCAA treatment (10%) before and after exercise

It was concluded that there was no significant difference in supplementing with BCAAs or none at all with regards to mental reaction time or stamina. However the 10% difference may infer that there is a possible advantage to supplementing with BCAAs for reducing recover time and reaction time during competition for athletes. [5]

BCAAs and Muscle Soreness - DOMS

Another test was performed and documented by Shimomura, Yamamoto, Bajotto, Sato, Murakami, Shimomura, Kobayashi, and Mawatari. It consisted of a squat exercise test on human subjects and recorded the effect of delayed-onset muscle soreness (DOMS). DOMS is essentially the soreness in the muscles days after exercising.

The study showed that BCAA supplementation before exercise reduced the effect of DOMS and accelerated recovery time in the days following the test. [4] These studies show that BCAAs have an obvious place in muscle protein synthesis and recovery, but are not shown to have a significant effect in recovery time reduction or reduction of muscle soreness after exercise. Seeing any extraordinary performance enhancing results from BCAA supplementation is unlikely.

With this research, it can be stated that BCAAs are critical in muscle protein synthesis but are not necessarily beneficial in increasing the rate of synthesis or decreasing the duration of muscle protein synthesis. They must be ingested throughout the day, or prior to exercising and as soon as possible after exercising to achieve optimal results.

Sources of BCAAs

A study was done by Reidy et al, which studied the ingestion of protein blends or single protein sources in supplement or powdered form after resistance training. [3] There are many different forms of protein from hydrolyzed isolates to concentrated whey protein. The study hypothesized that a blend of dairy proteins and soy protein would have the optimal delivery of amino acids and BCAAs and promote faster fractional syntheticrate (FSR). [3]

19 adults were studied before and after ingesting a relatively equal amount of either a protein blend, or whey protein supplement. [2] The results showed that initially, each supplement provided a similar rise in FSR. FSR began to drop in the late period for the whey protein group, but stayed elevated for the protein blend group.

Protein blend ingestion after exercise shows a capability of prolonging blood aminoacidemia, mTOR signaling, and skeletal muscle protein synthesis. With this being said a blend of dairy and soy proteins, immediately following a workout can be an effective nutritional supplement. [3]

BCAAs, Exercise and Muscle Protein Synthesis

BCAAs play a critical role in skeletal muscle protein synthesis following breakdown during exercise. BCAAs, primarily leucine, are the key amino acids involved in skeletal muscle tissue synthesis.

Studies have shown supplementing with BCAAs before and after exercise to be somewhat effective in reducing recovery time, increasing synthetic rate, and reducing post-exercise muscle soreness. Though the diet can give an adequate amount of BCAAs, supplementing can be effective before and after exercise because they are absorbed faster. Supplements containing BCAAs are often powders or capsules which can be immediately absorbed in the body.

A study has shown that a blend of dairy proteins (whey and casein) and soy protein can be an effective supplement to give the muscles optimal synthetic rate and sustainability. Many athletes swear by BCAA complexes to fuel their recovery and give them the extra edge. The fact of the matter is that even though the supplements can be absorbed faster and that studies have shown protein blends to keep synthetic rates elevated, there is really no significant correlation the BCAA supplementation and an increase in performance over the rest of the pack.

Being conscious about what goes in the body, especially around periods of intense training is critical to an increase in performance, but research does not firmly support the use of BCAAs as an essential ergogenic aid. Focusing on a well-balanced diet, consisting of whole grains, fruits and vegetables, lean proteins, and healthy fats will give the athlete all they need in regards to nutritional backing to their training and recovery.

Composition of Aminopower

Materials	Label Claim (mg)
L-Leucine	1180
L-Lysine (L-Lysine HCL)	813.98
L-Valine	628
L-Isoleucine	625
L-Threonine	350
L-Cysteine	160
L-Histidine (L-Histidine HCL)	185.26
L-Phenylalanine	100
L-Methionine	55
Vitamin C (Ascorbic acid- Coated)	41.237
L-Tryptophan	22
L-Tyrosine	33
Vitamin E (Vitamin E Acetate 50%)	19.97
Vitamin D2	2
Inactive & Excipients	
Citric acid	1456.649
Fatty acids polyglycerol esters	182
Sodium Citrate	500

Silicon Dioxide	20
HPMC	19.34
Colored with Vitamin B2	6
Lemon Flavour	5.4
Steviol Glycosides	0.77
Average weight	

Presentation: powder
Usage:

AMINOPOWER™

- **AMINOPOWER offers highest purity and quality of amino acids blended with Branched chain amino acids.**
- Comprehensive blend of essential and branched chain amino acids helps to promote muscle recovery, support metabolism, increases and maintains lean muscle mass and strength.
- Branched chain amino acids in AMINOPOWER helps to stimulate protein synthesis and aid for muscle repair.
- AMINOPOWER is a clean burst for healthy energy, helps you get to the extra edge.
- No artificial sweeteners like aspartame, acesulfame, sucralose... Etc. AMINOPOWER contains natural stevia rebaudioside 95 A (safest natural sweetener available).

Contra-indications: Product is contra-indicated in persons with Known hypersensitivity to any component of the product hypersensitivity to any component of the product.

Suggested Use: Mix 1 level scoop of powder with at least 10 ounces of water, juice, or preferred beverage daily or as recommended by your health-care or performance professional.

Warnings

Allergy warning

This product is contraindicated in an individual with a history of hypersensitivity to any of its ingredients.

Pregnancy

If pregnant, consult your health-care practitioner before using this product.

Interactions

There are no known adverse interactions or contraindications at publication date

Storage: Store in a cool, dry and dark place.

Funding

This work was supported in part by grants from lactonova nutritional research foundation hyderabad and funds from pugos products pvt ltd bangalore.

Conflicts of interest statement

The authors declare that there is no conflict of interest.

SUMMARY & CONCLUSION

There are 21 unique amino acids present in the human body, ten of which are essential for bodily function in adults and cannot be synthesized by the body. These are Phenylalanine, Valine, Threonine, Tryptophan, Isoleucine, Methionine, Histidine, Arginine, Leucine & Lysine.
histidine and arginine are required by infants and growing children. The amino acids leucine, isoleucine and valine are believed to account for approximately 60% of muscle tissue. it is believed that it is these amino acids that are most readily taken up and converted into catalysts, sparing other amino acids in the process for use in protein synthesis and in energy production.A protein containing essential amino acids is known as a “complete protein”. If one or more of those amino acids are missing, it is known as an “incomplete protein”.Aminopower powder containing essential amino acids thusit is known as a “complete protein supplement’’

REFERENCES

1) Hao C, Saksa K, Feiyi Z, Qiu J, Liming X. Genetic analysis of pathway regulation for enhancing branched-chain amino acid biosynthesis in plants. Plant Journal. 2010, August;63(4);573-583.
2) Norton LE, Layman DK. Leucine regulates translation initiation of protein synthesis in skeletal muscle after exercise. Journal Nutrition. 2006 February;136(2);533S-537S.
3) Reidy P, Walker DK, Dickinson JM, Gundermann DM, Drummond MJ, Timmerman KL, Fry CS, Borack MS, Cope MB, Mukherjia, R, et al. Protein blend ingestion following resistance exercise promotes human muscle protein synthesis. Journal Nutrition. 2013 April;143(4);410-416.
4) Shimomura Y, Yamamoto Y, Bajotto G, Sato J, Murakami T, Shimomura N, Kobayashi H, Mawatari K. Nutraceutical effects of branched-chain amino acids on skeletal muscle. Journal Nutrition. 2006 February;136(2);529S-532S.
5) Wisnik P, Chmura J, Wojciech Ziemba A, Nazar K. The effect of branched chain amino acids on psychomotor performance during treadmill exercise of changing intensity simulating a soccer game. Applied Physiology, Nutrition, and Metabolism. 2011 December;36(6);856-862.