

Remarkable Salmon Protein Hydrolysate from Norway.

AMIZATE® – truly natural and pure 25 amino acids, short peptides and micronutrients extracted from fresh Norwegian salmon protein.

One of world's best nutrient timing solutions with highest bioavailability, fastest absorption.

Metabolic optimization for health, performance and recovery.

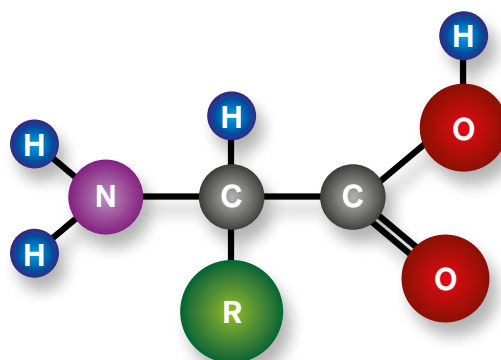




What is AMIZATE®?

Amino acids are the building blocks of all life. AMIZATE® contains the full spectrum of natural amino acids and short peptides supporting all bodily functions including speedy repair of muscle mass as well as regeneration of all vital proteins for the body.

- Regulatory status:
 - US – FDA: GRAS
 - EU: Not considered novel food
- Premium quality manufactured according to HACCP and EU/Nordic standards
- Amino acids & smallest peptide molecules extracted from fresh Norwegian salmon protein
- Contains bioactive peptides that are known for
 - antioxidant and ACE inhibition activity
 - lowering blood pressure and helping people with diabetes
- Clinically tested
- Vital for speedy muscle recovery and increased strength
- Highest bioavailability – fastest absorption
 - 50% faster than whey protein
- Supports healthy ageing
- A boost for mind and body
- A truly natural product made in a natural process



The generic structure of an alpha amino acid in its un-ionized form.





AMIZATE® originates from marine animal species and therefore it has the right amino acid profile for human protein synthesis. A large number of the amino acids in AMIZATE® are furthermore in the form of short chains of amino acids called peptides. These short peptides are larger building blocks for proteins, allowing even more efficient and speedy regeneration of proteins in the body. Many peptides also have important functions in the body on their own. *(Finn PF, Dice JF. Proteolytic and lipolytic responses to starvation. Nutrition 2006;22:830-44; Mitch WE, Goldberg AL. Mechanisms of muscle wasting. The role of the ubiquitin-proteasome pathway. N Engl J Med. 1996;335:1897-905)*

AMIZATE® is a unique nutritional supplement made in a natural process. This is nature's way of providing amino acids to build a healthy body.

Amino acids are the basic components of all proteins in the human body including skin, muscles, binding tissue, internal organs, blood and immune defense. Essential amino acids cannot be synthesized by the body at all and are therefore a vital component of our diet. A lack of amino acids will lead to degeneration of bodily functions. Adequate amino acid intake is therefore vital for life and healthy living. http://whqlibdoc.who.int/trs/WHO_TRS_935_eng.pdf

AMIZATE® also contains an impressive range of vitamins, minerals and trace elements which on their own support and maintain vital functions in the body.

What is the origin of AMIZATE®?

AMIZATE® has its origin from Russian scientists who developed the idea of a "superfood" for cosmonauts. The product could only be made in lab scale until the Norwegian company Zymtech Production AS, through its concerted R&D activities, was able to scale up the production process. Zymtech developed the concept of the "superfood" as a new and unique nutraceutical product. The abundant and fresh marine raw material sources from fisheries along the coast of Norway provided the ideal location for a large-scale production that has now been commercialized.

How is it made?

AMIZATE® is unique in that it originates from many different parts of the salmon. This means that proteins found in various parts of the fish will contribute to the uniqueness of AMIZATE®'s full spectrum of amino acids. Furthermore, the enzymes found in the fish itself are key to the natural processing of this unique product, creating the same types and relative amounts of amino acids and short peptides that are the building blocks of all new protein in the human body. In this way AMIZATE® is both natural and wholesome in its manufacturing as well as its composition.

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AMIZATE® – has its origin from Russian scientists who developed the idea of a "superfood" for cosmonauts.





How does it work?

The human body takes all its nutrition from its diet. Proteins are a particularly important part of the diet because they supply amino acids which are the fundamental building blocks of all human tissue. Proteins are large molecules that need to be digested by the human body before they can be absorbed. This is done by the body using enzymes which break down (hydrolyse) the protein into its constituent parts which are amino acids.



Digestion of proteins to amino acids requires a well functioning digestive system. However, the digestive capability of humans can be limited in many ways and in many situations.

New proteins can be formed in the body only if all of the required 20 amino acids are present in the required relative amount. That is why a diet lacking in adequate essential amino acids can lead to malnutrition and bodily degeneration.

During stress, your ability to digest is reduced

Digestion of proteins to amino acids requires a well functioning digestive system. However, the digestive capability of humans can be limited in many ways and in many situations. Some of the key situations that lead to limited digestive capability are:

- Strenuous physical activity, stress, trauma, exhaustion
- Surgery, use of antibiotics, chemotherapy and other medication
- Illness such as HIV, Crohn's disease, ulcerative colitis, inflammatory bowel disease
- Reduced digestive function related to old age, malnutrition

In these cases the body cannot provide itself with the essential amino acids, and supplements may be required. Furthermore, digestion of proteins takes time and energy, and the recovery effects will therefore not be immediate if whole protein is ingested.

AMIZATE® does not require digestion

AMIZATE® compensates for these digestive limitations by providing all required amino acids in free, digested form so that they are directly absorbed in the blood stream and available for protein regeneration with minimal delay. The high amount of free amino acids and short peptides is a unique feature with AMIZATE® not seen with other products.





Benefits and applications

The most common physiological uses of amino acids include building muscles, improving heart and circulatory problems, improving chronic fatigue syndrome, depression, anxiety, eating disorders, increasing memory and enhancing the immune system.

Who would benefit from supplementation with AMIZATE®?

- Sports enthusiasts and athletes seeking increased strength & endurance and rapid muscle regeneration
- General wellness for people of all ages and in particular those over 50
- Older population suffering from muscle loss (sarcopenia) leading to lower strength

Sports

AMIZATE® is an all-natural, full spectrum amino acid complex specifically tailored for optimal nutrient timing and metabolic recovery

– a product geared for athletes and active sports enthusiasts who require an efficient source of amino acids to support muscle anabolism and metabolic recovery.

Physical endurance requires amino acids and short peptides, since strenuous exercise significantly depletes amino acids in the body. Physical stress causes damage to muscle tissue. Replenishing amino acids and short peptides extends high levels of physical intensity.

Nutrient timing and metabolic recovery are two important concepts in sports nutrition that have become a focus for most athletes. AMIZATE® is uniquely positioned to offer significant benefit for athletes who require an efficient source of amino acids to support muscle anabolism and metabolic recovery. Protein does not work in demanding conditions since it takes time for benefits to appear. It furthermore takes energy to digest protein and digestion can also cause gastro-intestinal upset.



AMIZATE® is uniquely positioned to offer significant benefit for athletes who require an efficient source of amino acids to support muscle anabolism and metabolic recovery.

AMIZATE® in sports nutrition can deliver:

- Increased lean muscle mass
- Increased strength
- Increased endurance
- Increased aerobic capacity
- Decreased body fat

AMIZATE® is a nutritional breakthrough in sports nutrition:

- AMIZATE® provides the strength to push-on
- AMIZATE® supplies all essential and non-essential amino acids needed for muscle repair
- AMIZATE®'s short peptides deliver amino acids faster; are more bio-available; are an almost immediate source for restitution

With AMIZATE®'s complete set of amino acids:

- Amino acids are quickly absorbed into the blood stream
- No energy is expended on digestion
- AMIZATE® passes through the intestines without gastro-intestinal upset





General wellness

A healthy lifestyle starts with nutrition. “We are what we eat” is true in the sense that all nutrients to sustain and regenerate the human body come from our diet. However, in certain situations of stress, fatigue, exhaustion and illness the digestive system may not respond at all or respond quickly enough, or there may be inadequate amount of nutrients to provide for the required needs of the body. In these situations a boost of amino acids and short peptides, which are readily absorbed to the blood stream, can compensate for the lack of proper nutrition and normal digestion. Intake of free amino acids can also boost the immune system as documented in several studies:

Plasma amino acid concentrations in the overtraining syndrome: possible effects on the immune system. <http://europepmc.org/abstract/MED/1470018/reload=0;jsessionid=J3NZvF5gjSOPYJQ2vNZ2.42>

Effect of dietary protein and amino acids on immune function. Daby JM, Reynolds J, Sigal RK, Shou J, Liberman MD. <http://www.ncbi.nlm.nih.gov/pubmed/2105184>

Amino acids and immune function. Li P, Yin YL, Li D, Kim SW, Wu G. <http://www.ncbi.nlm.nih.gov/pubmed/17403271>

AMIZATE® can be taken as a daily supplement to aid protein regeneration not only of muscles, but also of skin, hair, eczema and wounds.

Use of Branched-Chain Amino Acids in Burn, Trauma and Sepsis. *J. Nutr.* 136: 308S-313S, 2006

It can be used as a component of a dieting formula as it provides both satiety and lean body mass.

AMIZATE® has a high degree of free amino acids which individually have important functions. In particular, AMIZATE® will give a boost to mood and brain function which can give a renewed feeling of wellness and alertness.

AMIZATE® contains more than 120 short peptides, and two peptides identified have known antioxidative and ACE inhibition activity; to lower blood pressure and help people with diabetes.

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Peptides with biological activities, released during gastrointestinal digestion or food processing, play an important role in metabolic regulation and modulation, suggesting their potential use as nutraceuticals and functional food ingredients for health promotion and disease risk reduction. Many studies have reported that peptides from various food sources possess bioactivities, including antihypertensive, antioxidant, anticancer, antimicrobial, and opioid activities as well as immunomodulatory and cholesterol-lowering effects. <http://www.ncbi.nlm.nih.gov/pubmed/18727554>



Recognized effects to the human body of individual amino acids

Alanine: cholesterol reducing effect, enhances immune system

Arginine: improve glucose metabolism, reduces healing time of injuries, quickens repair time of damaged tissue, helps decrease blood pressure in clinical hypertensive subjects.

<http://www.nutraingredients-usa.com/Research/Amino-acid-supplements-may-offer-diabetes-hope-Mouse-data>

Asparagine: required by the nervous system

Aspartic acid: needed for stamina, brain and neural health

Branched chain amino acids (valine, leucine, isoleucine): help to maintain muscle tissue, reduce muscle loss

Cysteine: important in collagen production (skin protein) and detoxification of the body; supports iron absorption to the body
<http://bloodjournal.hematologylibrary.org/content/35/5/669.full.pdf>

Cystine: needed in healing of burns and wounds; anti-aging effect

Glutamic acid: important neurotransmitter; important in metabolism of sugars and fats; used as fuel to the brain

Glutamine: important for the immune function; in removing ammonia from the brain; used in treatment of wasting muscles after surgery

Glycine: helps in absorption of calcium in the body; key role in manufacturing of hormones and in health of the immune system; helps to prevent epileptic seizures

Histidine: used to produce the neurotransmitter histamine; needed for growth and repair of tissue; helps in protection of nerve cells; required for the manufacture of both red and white blood cells

Isoleucine: promotes muscle recovery; needed for the formation of hemoglobin

Leucine: promotes muscle recovery; helps regulation of blood sugar levels; growth and repair of muscle tissue; hormone production; wound healing

Kaasra, B., R.J.F. Manders, E. van Breda, A. Kies, A.E. Jeukendrup, H.A. Keizer, H. Kuipers and L.J.C. van Loon, 2006. Effects of increasing insulin secretion on acute post-exercise blood glucose disposal. Med. Sci. Sports Exerc. 38:268-275

Lysine: helps production of muscle protein; needed in recovery from injury and after operations

Methionine: used to treat depression, arthritis pain and chronic liver disease

Phenylalanine: used to elevate mood; helps memory and learning; appetite suppressant

Proline: improves skin texture; skin protein (collagen) contains 15% proline; important for muscles, joints and tendons

Serine: required in fat metabolism, tissue growth and for the immune system (production of immunoglobulins and antibodies); important in the formation of cell membranes

Taurine: Essential for cardiovascular function, and development and function of skeletal muscle, the retina and the central nervous system. It also acts as an antioxidant, and has been shown to help people with congestive heart failure

Threonine: found in high concentration in the heart, skeletal muscles and central nervous system; used in treatment of mental health; helps maintaining proper protein balance in the body

Tryptophan: needed to maintain optimum health; a natural relaxant, alleviates insomnia; helps in the treatment of migraine headaches

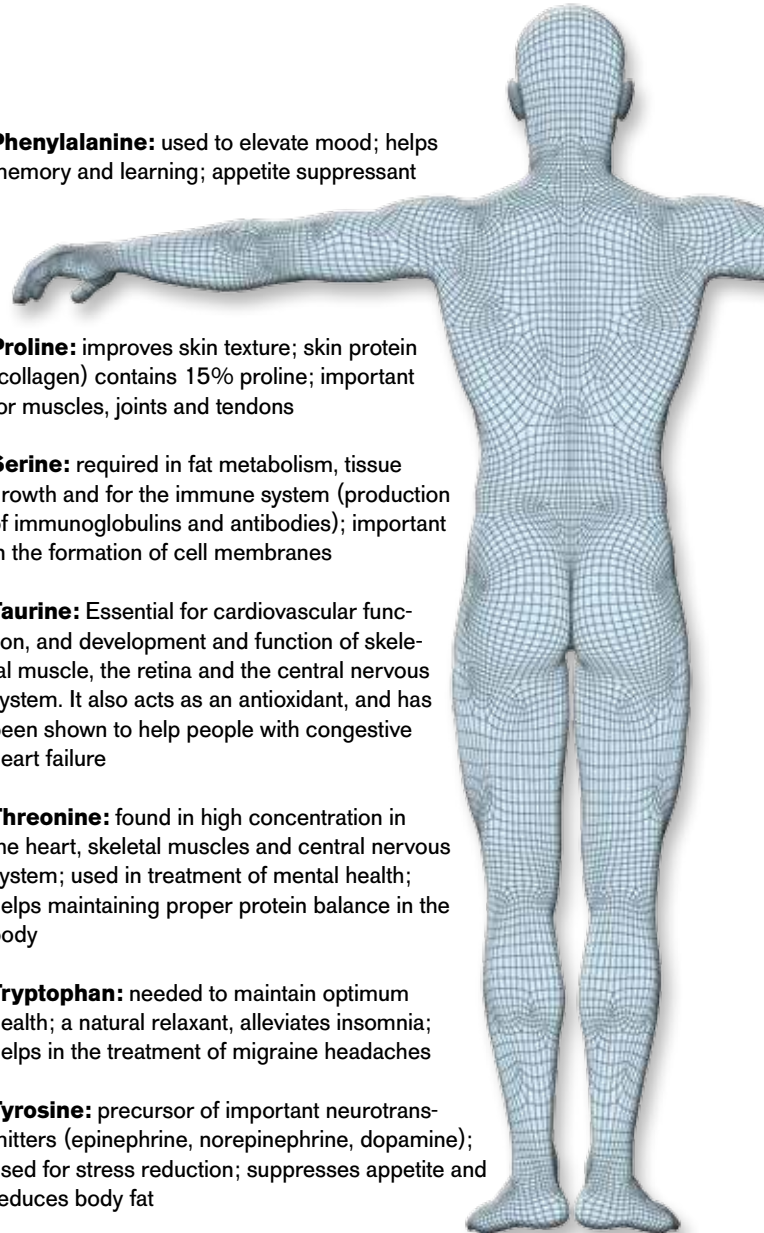
Tyrosine: precursor of important neurotransmitters (epinephrine, norepinephrine, dopamine); used for stress reduction; suppresses appetite and reduces body fat

Valine: found in high concentration in the muscles; required in muscle metabolism; needed for repair and growth of tissue; used as energy source for muscles

Even healthy people may need amino acid supplementation

Because stress, age, infection and various other factors including the amount of exercise a person does, can also affect the levels of amino acids, people with healthy, nutritious diets could also find that they suffer from amino acid deficiencies.

(J. Nutr. 136: 295S-298S, 2006 and J. Nutr. 135: 1596S-1601S, 2005)





Improved physical strength for healthy ageing

Sarcopenia or muscle loss is a common condition among the elderly. 25% of adults over 65 and as many as 50% of adults over 80 may suffer from sarcopenia. This leads to loss of muscle mass and function, and results in higher incidence of falls and fractures, lower mobility, lower quality of life and higher morbidity. Older people have increased needs for proteins (e.g. amino acids), but they tend to consume less than the young. This can have serious consequences for their muscle regeneration.

Sarcopenia is to a large extent a result of poor nutrition (low in proteins), but also reduced functioning of the digestive system with the result that the body develops an amino acid deficit. This again limits the body's ability to regenerate muscle mass.

Protein supplements are frequently prescribed, but these need to be digested to be useful to the body. AMIZATE® is unique in providing all the amino acids in readily usable form and in the right proportions for the human body. These effects combine to make AMIZATE® rapidly effective.

*Curr Opin Clin Nutr Metab Care. 2009 January ; 12(1): 86-90.
doi:10.1097/MCO.0b013e32831cef8b
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2760315/pdf/nihms111079.pdf>*

Elderly taking AMIZATE® as a daily dietary supplement will also feel the improved wellness from the increased availability of a full range of amino acids. In particular mental state, increased awareness and alertness may improve. Amino acids are used in therapies to relieve depression and elevate mood. Specific amino acids found in AMIZATE® are characterized as "brain fuel". Elderly with a sedentary lifestyle due to lack of strength and endurance can benefit from a daily boost of amino acids from AMIZATE®.

Effect of an enteral diet supplemented with a specific blend of amino acid on plasma and muscle protein synthesis in ICU patients.

(Clin Nutr. 2007 Feb;26(1):30-40. Epub 2006 Sep 25.)

Amino Acid Supplementation for Reversing Bed Rest and Steroid Myopathies. Curr Opin Clin Nutr Metab Care. 2004 Jan;7(1):79-87

Documentation supporting AMIZATE®

Zymtech Production AS has conducted a clinical trial on underweight/malnourished children. It ran over 120 days (April through July 2009) and was conducted at 6 government schools in New Delhi (Ghaziabad). A total of 438 schoolchildren of 6-8 years of age with mild to moderate malnutrition participated. The study followed stringent international standards for clinical trials (ICH).

The significantly higher gain in weight, height, Body Mass Index (BMI), speed and muscular endurance proved that AMIZATE® was more effective than the control (i.e. no intervention). Furthermore it was concluded that AMIZATE® is completely safe to consume. There were no serious adverse events reported during the study period.

A clinical study of competitive marathon runners who took AMIZATE® daily over a 60 day training period demonstrated reduced heart rate, improved running speed and reduced body weight while increasing running endurance, muscle strength, and overall wellbeing compared to baseline and placebo. The athletes taking AMIZATE® furthermore reported absence of muscle pain and improved sleep. There were no adverse effects reported related to AMIZATE® supplementation.





Properties

AMIZATE® is manufactured at Zymtech's production facility in Norway utilizing a proprietary enzymatic process which extracts amino acids, short peptides and micro-nutrients from pure marine sources.

AMIZATE® has the following composition:

Typical profile of amino acids: (Method: 98/64/EC)		
Amino acid (g/kg)	Total	Free
Alanine	52	40
Arginine	38	30
Aspartic acid & Asparagine	60	22
Cystine & cysteine (as cysteic acid)	5	3
Glutamic acid & Glutamine	91	42
Glycine	56	24
Histidine	16	12
Hydroxyproline	4	na
Isoleucine	31	24
Leucine	55	46
Lysine	53	39
Methionine	19	17
Phenylalanine	29	23
Proline	34	7
Serine	29	20
Threonine	31	30
Thyroxin (mg/kg)	3	na
Tryptophan	8	3
Tyrosine	25	20
Taurine (mg/kg)	7	na
Valine	41	34

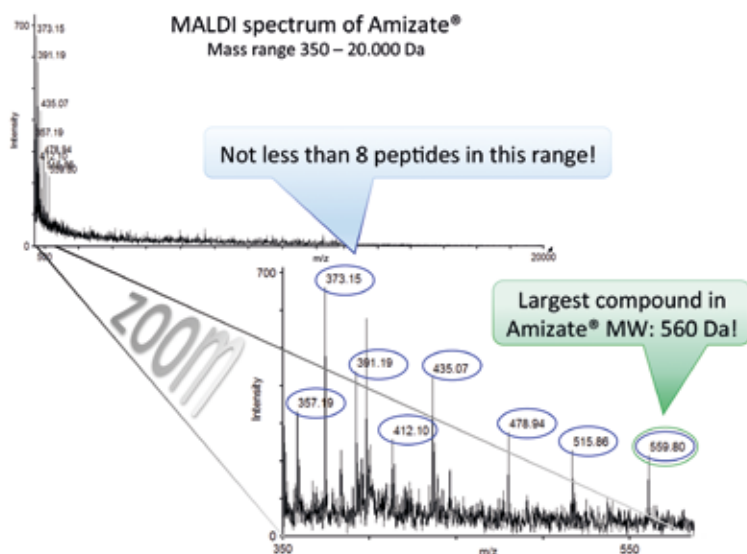
Important micronutrients:	Amount	Unit
Potassium (K)	78	g/kg
Sodium (Na)	10	g/kg
Iron (Fe)	86	mg/kg
Zinc (Zn)	1650	mg/kg
Iodine (I)	2	mg/kg
Selenium (Se)	6,6	mg/kg
Vitamin B1 Thiamine	< 2.4	mg/kg
Vitamin B2 Riboflavin	2.1	mg/kg
Vitamin B3 Niacin	42	mg/kg
Vitamin B6 Pyridoxine	6.7	mg/kg
Vitamin B9 Folic acid	1.9	mg/kg
Vitamin B12 Cobalamin	1.6	mg/kg
Vitamin C	570	mg/kg



Zymtech's modern production facility is located in the Norwegian mountains close to the fjords where the salmon is located.



Molecular weight distribution MALDI spectrum of AMIZATE®



Molecular weight distribution analysis (MALDI) shows that AMIZATE® is composed of only very small molecules of molecular weight of 560 Dalton and lower. Around 60% of AMIZATE® consists of amino acids in free form and the remaining 40% are short peptides (short amino acid chains). This is very important since only free amino acids and very short peptides can cross the membranes to the arteries in the intestinal tract.

(Gardner et al. *J.Physiol.(Lond)*. 439:411-422, 1991; Silk et al. *J.Parent.Ent.Nutr.* 4 (6):548-553, 1980)

Peptides

AMIZATE® contains over 120 short peptides. Three of these have been identified and have known bioactivity.

ANSERINE is an antioxidative bioactive dipeptide containing β -alanine and histidine, which is present in the human skeletal muscle and brain. Oral administration of anserine reduced blood glucose levels during oral glucose tolerance testing in humans. Conducted anserine supplementation in the elderly brings promising effects on cognitive functioning and physical capacity of participants.

Ron Kohen et al. «Antioxidant activity of carnosine, homocarnosine, and anserine present in muscle and brain.»

Medical Sciences Vol. 85, pp. 3175-3179, May 1988

Kubomura D. et al. «Effect of anserine ingestion on hyperglycemia and the autonomic nerves in rats and humans.»

Nutr Neurosci. 2010 Aug;13(4):183-8

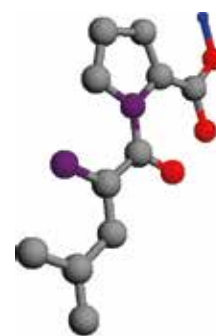
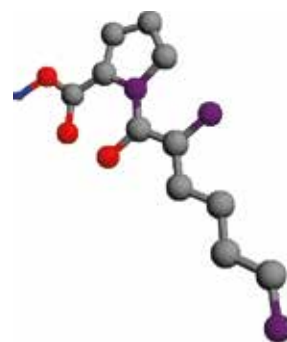
D. Szcześniak «Anserine and carnosine supplementation in the elderly: Effects on cognitive functioning and physical capacity.» *Archives of Gerontology and Geriatrics September-October, 2014 Volume 59, Issue 2, Pages 485-490*

LYSINE-PROLINE (KP) is an antioxidative bioactive peptide which is also known for its ACE inhibition activity (reduces hypertension/high blood pressure and congestive heart failure).

ISOLEUCINE/LEUCINE-PROLINE (IP/LP), a bioactive peptide, is also known for its ACE inhibition activity; it is known to lower blood pressure and to help people with diabetes (DPP-4 inhibitor).

Recent scientific studies on bioactive peptides from marine species have revealed the importance of the peptide molecules in the functioning of the human body as neurotransmitters, antimicrobial agents, and more.

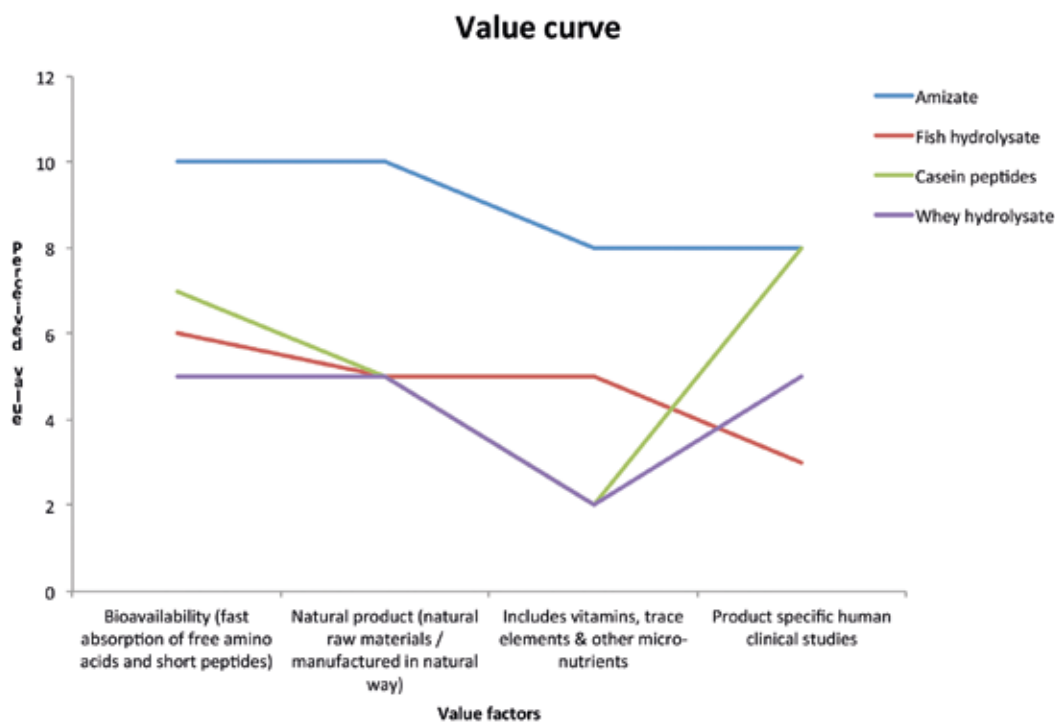
(<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3418817/>)



Key parameters demonstrate higher perceived value of AMIZATE®

A value curve analysis comparing AMIZATE® to other products demonstrates that AMIZATE® may have significantly higher perceived value with regard to the following key value parameters:

- Its high bioavailability (speedy absorption in the body due to free amino acids and low molecular weight peptides)
- Being truly a natural product
- Containing a number of vital micronutrients
- Benefits being supported by product specific clinical studies



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