



## Amino Acids in Moringa

### Essential Amino Acids in Moringa Oleifera

#### Isoleucine

Builds proteins and enzymes, stimulates the brain, promotes muscle recovery after physical exercise, regulates blood sugar levels and is used to make the vital iron carrying hemoglobin.

#### Leucine

Is used in the liver, but primarily in the muscle and fat. It is used in the bio-synthesis of sterols in the body and has the ability to stimulate muscle growth and inhibit muscular degradation.

#### Lysine

Is important for proper growth, and it plays an essential role in the production of Carnitine, a nutrient responsible for converting fatty acids into energy and helping to lower cholesterol.

Lysine aids in the absorption of calcium, plays an important role in the formation of collagen,

(benefits bones, connective tissues including skin, tendon, and cartilage) and the formation of antibodies, hormones and connective tissues.

## Methionine

Is best known for its ability to supply sulfur and other compounds required for the metabolism and growth. Sulfur is a key element and vital to the utilization of a number of antioxidant nutrients. It lowers cholesterol and reduces fat in the liver while increasing lecithin production.

## Phenylalanine

The body changes this into tyrosine, another amino acid that is needed to make proteins, and neurotransmitters, including L-dopa, epinephrine, and norepinephrine, and thyroid hormones. Norepinephrine can affect mood, and different forms of phenylalanine have been proposed to treat depression.

## Threonine

Helps the liver reduce fat, maintains protein balance and supports cardiovascular, liver, central nervous system and immune system function by being involved in the production of antibodies. It is involved in the production of collagen, elastin, connective and muscle tissue, especially the heart, where it is found in higher concentration and may decrease wound healing and recovery time from injury. Links indicate the Threonine may be beneficial in the treatment of Amyotrophic Lateral Sclerosis (ALS) and Multiple Sclerosis (MS).

## Tryptophan

Assists normal growth in infants and for nitrogen balance in adults. The body uses tryptophan to help make the B vitamin, niacin, and the neurotransmitter, serotonin. Serotonin regulates mood, appetite and sleep and decreased levels of this neurotransmitter is linked to depression.

Tryptophan supports your immune system, alleviates insomnia, reduces anxiety, depression and relieves symptoms of migraine headaches.

## Valine

Is a branched-chain amino acid found in high concentration in muscle tissue. Valine is helpful in treating addictions. A deficiency may affect the myelin covering of nerves. Aside from being a component of many proteins, very little is known about the independent function of Valine.

# Non-essential Amino Acids in Moringa Oleifera

## Alanine

Is important when it comes to providing energy for your muscle tissue, brain, and central nervous system. This common amino acid is manufactured from other metabolites in the liver and plays a key role in the breakdown of glucose for energy and stabilizes glucose levels during exercise. Alanine is used in the production of neurotransmitters, antibodies and stimulates lymphocyte production.

## Arginine

Plays an important role in cell division, the healing of wounds, removing ammonia from the body, immune function, and the release of hormones. It has been shown in studies to cause the release of the growth hormones which are considered necessary for muscle growth and tissue repair, decreasing healing time. Arginine is a precursor for the production of nitric oxide and is related to treating erectile dysfunction and improves cardiovascular function (lowering blood pressure) because it relaxes smooth muscle, acts as a vasodilator and increases blood flow.

## Aspartic Acid

Acts as a neurotransmitter and is involved in hormone production and release and nervous system function.

## Cysteine

Is a non-essential amino acid. In certain cases it may be considered to be essential, such as premature infants, the elderly, or those with metabolic disease or a malabsorption syndrome, and must be supplied from dietary sources. Cysteine acts as an antioxidant and protects against radiation and pollution. It will slow the ageing process, deactivate free radicals, and neutralize toxins. Cysteine is involved in the formation of one of the most potent detoxifiers in the body, glutathione in the lungs, liver, kidneys, and bone marrow.

# Glutamic Acid

Helps to prevent ammonia intoxication. It is an active neurotransmitter substance, and is important for memory and learning. Glutamic Acid is converted into the anti-neurotransmitter GABA, which may help to prevent seizures.

# Glycine

Is used in muscular tissue, DNA and RNA creation, and converting glucose into energy. It prevents muscular degeneration by increasing levels of Creatine. It is also an inhibitory neurotransmitter which is important for the digestive system and nervous system function.

# Histidine

Is an **ESSENTIAL AMINO ACID** in infants and may be essential for some adults. Histidine is used to form a neurological compound called histamine released during allergic responses. It is used for growth and for the repair of tissue, as well as the preservation of the myelin sheaths that protect nerve cells. Histidine is required for the fabrication of both red and white blood cells, and helps to protect the body from damage caused by radiation and in heavy metals detoxification.

# Serine

Plays a major role as a catalyst for many enzyme functions. Serine is involved in the formation of immunoglobulins and antibodies strengthening the body's immune system. Plus, it synthesizes fatty acid sheaths around nerve fibers.

# Proline

Aids in the production of collagen and therefore affects joints, cartilage, tendons, the heart and skin. It is a precursor to Glutathione and very important for strengthening the heart.

# Tyrosine

Is a building block for several neurotransmitters, including epinephrine, norepinephrine and dopamine, and supports the function of the thyroid, adrenal, and pituitary glands. Tyrosine is a factor in regulating endocrine hormonal function. Structurally it is a component in most of the proteins in the body