

## URBAN FARMER MACRO SOLUTIONS

### MACRO PREMIXES AND AMINO ACIDS

An Urban Farmer Macro Solution includes the provision of analytical services, the design and formulation of feeds, the manufacture and supply of customized macro premixes, as well as ongoing monitoring and support of the solution. The solution brings together the knowledge and products of the world's leading animal nutrition and animal health companies and makes them accessible to the farmer.

#### MACRO PREMIXES AND AMINO ACIDS

An Urban Farmer macro premix is a complimentary feed additive, consisting of vitamins, minerals, trace elements, amino acids, enzymes and non-nutritive ingredients on a limestone carrier. Urban Farmer engages the world's leading premix companies to blend its macros premixes and only uses the highest quality ingredients. The amino acids employed are included at the correct levels for their intended purpose and are selected based on their stability, bioavailability, mixability and safe handling characteristics.

#### WHAT ARE AMINO ACIDS

Amino acids are the building blocks of proteins, and they play a critical role in animal nutrition. They are essential for growth, development, and maintenance of various body functions in animals.

Here are some of the key roles that amino acids play in animal nutrition:

- **Growth and development:** Amino acids are required for the synthesis of new proteins, which are necessary for the growth and repair of tissues such as muscles, bones, and organs.
- **Metabolism:** Some amino acids can be converted into glucose, which can be used as an energy source by the animal's body.
- **Immune function:** Amino acids are necessary for the production of antibodies and other immune factors, which help protect animals from infection and disease.
- **Hormone production:** Some amino acids are precursors to hormones, which regulate various physiological processes in the body.
- **Reproduction:** Amino acids are necessary for the production of hormones and other molecules that are involved in reproduction.

Not all amino acids are essential for animals, meaning that they can be synthesized by the animal body, but there are some that animals must obtain through their diet, these are called essential amino acids. Each species has different essential amino acid requirements, and a diet deficient in one or more essential amino acids can lead to reduced growth, poor health, and reduced production performance.

#### ESSENTIAL VS NON-ESSENTIAL AMINO ACIDS

**Essential amino acids:** These are amino acids that animals cannot synthesize in their body and must be obtained through their diet. Essential amino acids are essential for growth, development, and maintenance of various body functions. Examples of essential amino acids include lysine, threonine, and methionine.

**Non-essential amino acids:** These are amino acids that the animal's body can produce, and therefore, they don't have to be obtained through their diet. However, non-essential amino acids are important for the maintenance of body functions and are necessary for the synthesis of certain proteins. Examples of non-essential amino acids include alanine, asparagine, and glycine.

It's important to note that the essential amino acid requirements vary depending on the species, age, and production stage of the animal, and a diet deficient in one or more essential amino acids can lead to reduced growth, poor health, and reduced production performance.

It's also important to remember that even though non-essential amino acids are not essential in the diet, they play a role in the animal's body, and some of them can be converted into glucose and other molecules that can be used as an energy source.

To provide a balanced and complete diet, it's important to consult with a nutritionist and to understand the amino acid profile of the feed ingredients being used.

## **SOURCES OF AMINO ACIDS**

Here are some sources of amino acids that can be included in a livestock animal's diet:

- **Protein-rich feed ingredients:** These include soybeans, canola meal, fish meal, cottonseed meal, and blood meal. These ingredients are high in amino acids and can provide the animal with the essential amino acids that it needs.
- **By-product feed ingredients:** These include distillers dried grains with solubles (DDGS), brewers grains, and corn gluten meal. These ingredients are high in amino acids and can be used as a source of non-essential amino acids.
- **Synthetic amino acids:** These are amino acids that are produced by chemical synthesis. They can be used as a source of essential amino acids and are often used in feed ingredients to balance the amino acid profile of the diet.
- **Forages:** Some forages such as alfalfa and clover are good source of protein and amino acids. However, the availability of amino acids in forages can vary depending on the specific forage and the stage of growth, so the availability of certain amino acids might be limited.

It's important to note that the availability of amino acids in these sources can vary depending on factors such as the quality of the source, storage conditions, and how the feed is processed. Additionally, it's important to consult with a nutritionist to ensure that the feed ingredients being used provide the right balance of essential and non-essential amino acids for the specific needs of the livestock animals.

## **SYNTHETIC AMINO ACIDS**

There are several synthetic amino acids that are available for livestock nutrition, some examples include:

- **L-Lysine:** an essential amino acid that is often added to feed for poultry and swine to increase growth and improve feed efficiency.
- **DL-Methionine:** an essential amino acid that is often added to feed for poultry and swine to improve feathering and to increase the sulfur content of the diet.
- **L-Threonine:** an essential amino acid that is often added to feed for poultry and swine to improve growth and feed efficiency.
- **L-Tryptophan:** an essential amino acid that is often added to feed for poultry and swine to improve growth and feed efficiency.
- **L-Valine:** an essential amino acid that is often added to feed for poultry and swine to improve growth and feed efficiency.

These synthetic amino acids are commonly used in feed ingredients to balance the amino acid profile of the diet and to meet the specific requirements of the animal species. They are produced by chemical synthesis and are available in various forms, such as powders and liquids.

It's important to note that the use of synthetic amino acids should be done under the guidance of a nutritionist, as they should be used in conjunction with a balanced diet that provides the other essential nutrients that the animal needs. Also, it's important to remember that these synthetic amino acids should be used in the appropriate amounts and at the appropriate stage of the animal's life to avoid any negative impact on the animal's health or performance.

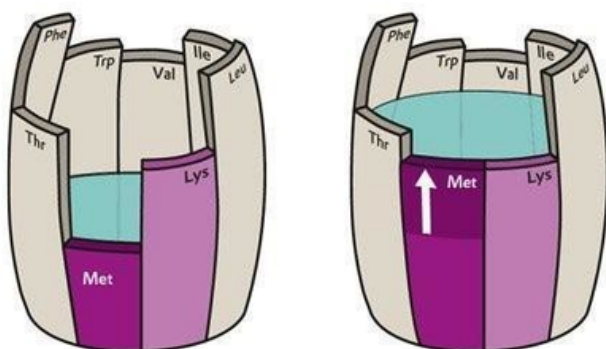
## THE BARREL & STAVE MODEL

The Barrel & Stave model is a concept used to describe the relationship between essential and non-essential amino acids in animal nutrition. It represents the essential amino acids as the staves of a barrel and the non-essential amino acids as the barrel itself.

In this model, the essential amino acids are considered to be the "staves" of the barrel because they are the structural support that holds everything together. The non-essential amino acids, on the other hand, are considered to be the "barrel" because they are the filler that surrounds the essential amino acids and hold them in place.

The idea behind this model is that an animal's diet must provide the right balance of essential and non-essential amino acids in order to support growth and maintain health. If an animal is deficient in one or more essential amino acids, it will not be able to form the structural support necessary for growth and repair of tissues. Even if the animal is consuming enough non-essential amino acids, it will not be able to utilize them effectively without the proper balance of essential amino acids.

In practical terms, the Barrel & Stave model illustrates the importance of providing a balance of essential and non-essential amino acids in the diet. It emphasizes that the essential amino acids should be the focus of the diet and that the non-essential amino acids should be used to complement and balance the essential amino acids. Figure 1 demonstrates an example of where Methionine is deficient.



**FIGURE 1** illustrates the limitation of protein synthesis due to the lack of an essential amino acid. The shortest stave of the barrel represents the first limiting amino acid (here Met)

Einarsson M.I., Jokumsen A., Baek A.M., Jacobsen C., Pedersen S.A., Sameulsen T.A., Palsson J., Eliassen O., and Triplentine O.E., June 2019. Nordic Centre of Excellence Network in Fishmeal and Fish oil. ISSN 1670-7192.

## URBAN FARMER MACRO SOLUTIONS – MACRO PREMIXES AND AMINO ACIDS

It's important to consult with a nutritionist to understand the essential amino acid requirements of the specific animal species and to ensure that the diet is providing the right balance of essential and non-essential amino acids.

Urban Farmer designs and formulates appropriate premixes and then engages the world's leading premix companies to manufacture them. We only indicate validated best-before-dates on our products thus ensuring that what is stated on the label is in the bag, and available to the animal through its feed.