



Deer Feeding 101: What is Protein?

What do you think about when you hear protein? Some probably think of "protein pellets", some think muscle growth, some think antler mass, but what is protein? Proteins are part of every cell, tissue, and organ in the body of a deer. Proteins in the body are constantly being broken down and replaced; because of this the deer constantly have a need for protein in their diet that can be digested to keep the process of protein metabolism going. This article will review what protein is and why animals need protein to attain optimal growth.

Proteins are composed of small units called amino acids which are often called the building blocks of a protein molecule. There are 20 different amino acids that make up protein. Think of it like a bunch of lego blocks made up of 20 different colors all snapped together. The different colors of the individual Lego blocks are the 20 amino acids. All the blocks snapped together in the final shape represents a protein made up of all its amino acids. Most proteins are very large molecules so it could be hundreds or thousands of individual lego blocks (amino acids) making the shape.

Proteins form the major components of muscles, skin, tendons, blood vessels, hair and also the core matrix of bone, antler and teeth, and are responsible for the following, among other things:

- They help with growth and wound healing.
- Proteins serve as enzymes for digestion and energy metabolism, hormones, and immunoglobulin's.
- Protein is involved in oxygen transport in the blood, muscle contraction, and other activities throughout the body, as red blood cells, that carry oxygen, are roughly 90% protein.

Protein along with energy, water, and minerals are key foundation nutrients of deer nutrition. Let's look at an example on the importance of good protein nutrition. Many of us use additives to help with blood flow and oxygen transport to improve antler growth. However, without solid protein nutrition, the value of those additives are reduced, because protein is needed to build the red blood cell that will help carry the oxygen. It is kind of like painting wood siding with wood representing the protein and paint the additive. When the wood is rotten, the paint makes it look good briefly, but in the end there is no real structure so the siding just falls apart. A solid foundation of good wood prior to painting is important because the paint sticks, helps protect the wood and adds to the structural soundness. A solid protein nutrition foundation can be enhanced, but without the solid protein nutrition foundation to start with, the deer will have trouble attaining the genetic potential we want it to.

The efficiency or degree to which dietary proteins can be used for building parts of the deer's body is largely determined by the type and relative amounts of amino acids present in the particular protein. There are high quality protein sources and low quality protein sources. Quality is determined by the amino acid profile of the protein. The body has the ability to interconvert and make some of the amino acids, but there are 10 amino acids that the body cannot make; they are called the essential amino acids; lysine and methionine are two of these 10 that are commonly talked about.

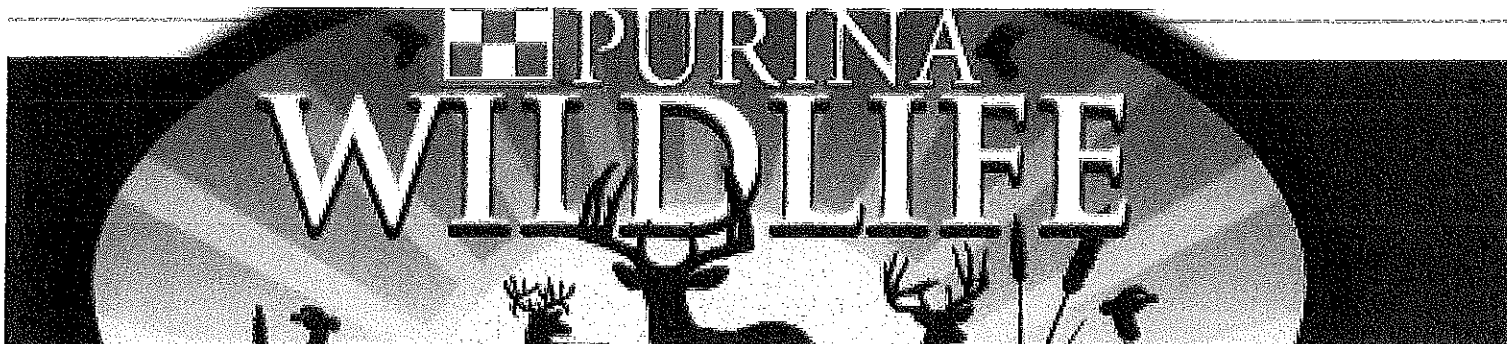
The nutritive value of proteins is determined by the presence in adequate amounts of the essential amino acids. For instance, most animal proteins contain all of the essential amino acids in sufficient amounts; this makes coyote nutrition fairly easy. Deer eat browse, forbs and mast which are plant proteins. Most plant proteins contain some of the essential amino acids but may not contain all of them so it can be important to blend different plant source proteins together to get the right balance of essential amino acids. Since deer do not have a kitchen to do fancy cooking, how do they make this work eating plants?

Deer (and other ruminants) have a unique strategy here; the rumen breaks down a large proportion of the proteins in plants the deer eat. This protein that is broken down is then used to help the microbes (rumen bugs) that live in the rumen grow. The bodies of rumen microbes are typically 65% protein or more. The protein in microbes is very a high quality amino source (loaded with essential amino acids). The fermentation by bugs in the rumen allows deer to improve the quality of the protein that it has consumed. The amino acid profile of rumen microbes is very close to that of muscle and milk the deer produces. The rumen acts as a balancing system to improve the amino acid quality of the diet the deer eats. In other words the rumen upgrades the protein the deer consumes to make the amino acid profile of that protein meet the needs of the deer. These needs or requirements can be antler growth, muscle growth, lactation and others.

So what does this mean in practical terms? Deer need protein with a high quality amino acid profile to grow, lactate, remain healthy and grow antlers. Looking at antlers for a second, growing antlers contain more protein than mineral. During antler growing season protein nutrition is very important. Hardened antlers contain more mineral than protein. We want to ensure enough protein is delivered during the first 2/3 of antler growing season to maximize the protein matrix that will later be filled by mineral. We need to feed the deer to ensure the rumen has enough protein available to the rumen microbes.

The exact level of crude protein you need to feed depends on your operation; typically 16 to 20 percent crude protein diets are used when feeding pen deer. Making sure the microbes have protein will help to optimize the amount of high quality amino acids made available to the deer through rumen fermentation. Then in times of peak protein needs (antler growth, lactation) we can strategically supplement amino acids to the animal to supplement the gap between the amino acid supply the rumen puts out and the amino acid requirements the deer has at these key times.

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Deer and Protein

There is considerable controversy regarding the percentage of dietary protein that deer should have. Many people believe that deer cannot tolerate more than 16% dietary protein and that high-protein diets are wasteful or even toxic. This simply is not true.

Research in South Texas has shown that wild deer diets at certain times of the year can be over 25% protein. Many forms highly utilized by deer are over 30% protein. Obviously, the wild deer are unharmed by consuming these high-protein plants. Indeed, excellent antler growth years were those with superb spring forage conditions. The resulting antler growth suggests that not only were the deer not harmed by their high-protein diet, they actually utilized the protein to grow bigger antlers, indicating that higher protein is necessary for a buck to achieve his genetic potential for antler growth.

Pelleted diets designed to supplement natural forage need to be greater than 16% protein because the forage portion of the diet is often inadequate in protein content. Even in a good year, the digestible protein content of major deer browse species often falls well below 10% by late summer and will likely remain there until the spring green-up. In a tough year (late winter, drought, etc.), the nutrition supplied by natural forages can be inadequate even in the spring. Without supplemental protein, deer cannot maintain optimal body condition, which is essential for maximal antler growth.

Deer in confinement being fed complete diets should have at least 16% dietary protein in order to try to maximize health, growth and antler development. Today's champion bucks are commonly being raised on diets containing 20% protein. Some people even feed diets containing as much as 24% protein with no adverse effects.

Protein is needed for maintenance and growth of all organs in the body as well as for many physiological functions, and the individual needs for protein are affected by many factors such as genetics, environment, disease and parasite challenges, etc. The body has a "priority of life" list, and protein goes first to those functions that are deemed most important to survival. Antler growth, while desirable and important for social hierarchy, is not necessary for life and appears at the bottom of the priority list from the deer's viewpoint. Therefore, unless there is enough protein in the diet to meet all the priority needs and have enough left over for optimal antler growth, trophy racks will not happen, no matter what the genetic potential of the buck. If you want to see giant antlers, you will need to provide the necessary protein.

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pick 2 Amino Acids -- tell what you can about them
essential

Buck

Spring
↓

Summer
- / ↑

Fall
- / ↓

Winter
- / ↑

Doe

~~Female~~

↑↑↑
(breeding)

↑↑↑
(lactating)

- / ↑

- / ↑

Fawns/Heavings

↑ (Y)

(F) ↑↑

(F) ↑

(Y/F) ↑