MEDICINE AND MANAGEMENT

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Facts to know about protein

It is at the same time easy and difficult to define a protein. It is easy to give a fairly clear idea generally what we mean. It is difficult in being absolutely precise about our definition.

The word protein is most familiar when used in connection with food or feed. Protein is the body building constituent of the diet which is essential for growth and life itself. It is a component of the structures of all cells and amounts to about 13 per cent of the body weight. It is not a single substance but a very large class of substances. They are fundamentally similar in many ways.

Proteins are built from chemical units called amino acids. They, like carbohydrates, contain carbon, hydrogen, and oxygen elements. They also contain the element nitrogen, and this is the most important factor which distinguishes them from other food substances. Approximately 16 per cent of the protein compound is composed of nitrogen.

Protein can be a source of energy and is figured into the TDN (total digestible nutrients, or TDE (total digestible energy) along with carbohydrates and fats. But when protein has to provide some of the energy it is a very inefficient conversion. Some of its nutrient value is lost when protein, which is a body building and structural substance, has to be converted into an energy source due to inadequate energy supply. The importance of balancing protein and energy cannot be stressed too much. Dietary protein should be able to be used directly for body protein, for the development and maintenance of tissues and vital organs and for normal fermentation in the rumen.

A lack of dietary protein will greatly alter the rate of growth, maturation, and milk production of dairy cattle. Since protein is not toxic, large excesses can be fed without danger, and while usually not detrimental to the health of the animal, it is a very uneconomical practice. Although usually not fed to great excess, more profit is usually lost from overfeeding than underfeeding protein.

Rations that are deficient in portein are poorly utilized in respect to the other nutrients also, and thus are associated with unthriftiness and poor growth. Good nutrition has an important role in preventing infections. Antibodies, for example, are primarily protein, and dietary protein is vital for their manufacture.

Undernourished cattle do not exhibit many well-defined signs. The resultant appetite usually is poor - which may lead the owner to conclude that an inadequate ration is not the cause of the problem. The demand of the animal must be taken into consideration also, as the requirements are higher during late gestation and peak lactation.

The rumen of the cow and other ruminants makes them unique in the animal kingdom regarding protein metabolism. Rumen microorganisms (bacteria and protozoa) can degrade (break down) protein and non-protein nitrogen compounds of the feed (urea and biuret). Ammonia is the major nitrogen compound produced and is used by the bacteria and protozoa to make protein for their own use. This protein is eventually digested in the small intestine. Urea is not effectively used by non-ruminant animals or small calves where the rumen is not yet developed, but in older cattle urea in the ration to a limited degree is a beneficial as high quality true proteins. In former years when there was a larger price difference between urea (non protein nitrogen) and vegetable protein, urea played a much larger role in providing nitrogen for some of the dietary protein. Urea should be limited and latest recommendations indicate it should not make up more than one per cent of the concentrate.

Ruminants are unique in that you are not feeding the animal; you are feeding the micro-organisms in the rumen. They can take nitrogen from urea or degraded natural protein and combine it with other nutrients in the ration to build their own body protein. The urea is broken down to ammonium, then the ammonium is converted, along with other ingredients, especially carboydrates or other energy source, to bacterial protein which is then digested and utilized by the ruminant. If there is a deficiency of carbohydrates in the diet an excess of ammonium accumulates in the rumen. If absorbed in sufficient amounts the animal can become toxic.

Sudden changes in the protein content or source can cause disorders and acute indigestion, putting cattle off feed for extended periods of time. Only certain organisms are capable of utilizing certain proteins, and if the source or type of protein is suddenly changed, the cow is left with a rumen full of organisms for which there is now no "feed", and only a few organisms which can utilize the new "feed". These will multiply until they can fully handle the new feed supply but it takes time. All changes should be made very gradually so as not to upset the rumen "bugs".

Protein requirements vary with size and age of the animal, stage of lactation and gestation, and the amount of milk being produced. Tables and charts are available in many publications including the National Academy of Sciences book listed in the last column. Protein requirements are added for growth (if still growing), maintenance (repair and replacement of tissues), production, and reproduction.

The best and most economical protein is from your own forages, especially good early cut, leafy legume hay. What your forages can't supply must be balanced out in the concentrate. This is the livelihood of the feed industry, to provide the protein in a concentrated form to supplement home grown protein balance the energy of home grown grains and silage. Consequently pro is often overfed as muc underfed in relation energy supply, especiall the lower producing en the herd.

The importance adequate, high qua protein cannot be stre too much. It must the balanced with an adeq energy supply to insure the protein is not i ficiently used and maxi utilization is obtained f the protein which available. Crude prote the total protein in ration. Only the diges protein can be used by animal and this can greatly in some feeds. remember, any cha should be made gradu We don't want to upset t millions of rumen 'b working so hard ma protein which is so vit the animal and to you.