



## ..... STRAIGHT FROM THE HORSES MOUTH

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If you look out in the stalk fields where cows are now grazing, not only do you see electric fences, water tanks and cattle – but you will also most likely see lick tanks or tubs. It interests me that many people have no idea what is in those tubs, including some people that actually use them. Actually many producers utilize these tubs and tanks as a tool to increase productivity within their herd. Some of those tanks contain natural protein sources, but many contain something call NPN (Non-protein Nitrogen). I might ask, if you could get the same productivity out of your cattle for less cost, wouldn't you consider it? Use of protein supplements containing NPN can be an economically smart alternative for healthy, mature ruminants. Use of NPN-containing supplements is a long established, successful practice. But many misconceptions exist.

I think it would be beneficial to explore how this tool works and give an explanation on what makes it a viable and relative cheap source of nutrition. First we need to realize that NPN or non-protein nitrogen refers to a source of nitrogen that is not derived from protein as we normally think of it. Urea is the most common source of NPN in livestock feeds. Urea utilized in livestock feeds is a synthetic compound manufactured specifically for feed and fertilizer use. I have had people actually tell me that they understood it is harvested from urine of slaughtered animals. I can assure you that it is not! Also some believe that it does not work the same way as natural urea works in the rumen. Actually synthetically manufactured urea functions in the same way within the rumen as naturally occurring urea.

We need to realize that the rumen microbes break down most protein consumed and ammonia is produced as a by-product. Ammonia can be utilized in one of two ways. Microbes can use it to form microbial protein or, if ammonia levels exceed the microbes' ability to utilize it, ammonia is absorbed into the blood stream where it is carried to the liver. The liver detoxifies ammonia and converts it into urea to be excreted into urine. A portion of urea is recycled back to the rumen through saliva. Enzymes in the rumen rapidly break down urea back into ammonia which can then be used by microbes or absorbed. Rumen microbes use ammonia as a part of their diet. It doesn't matter if it originates from true protein or NPN.

Other necessary nutrients for microbial growth are carbohydrates and minerals. It is essential that ammonia be released simultaneously with available energy for ammonia to be converted into microbial protein. Also, phosphorus, sulfur and trace minerals must be present within the rumen environment in order for microbes to manufacture essential amino acids. The cow receives beneficial protein for its own needs when the bacteria and protozoa pass from the rumen to the abomasum and intestines where the microbes themselves are digested. Let us now look at some advantages of non-protein nitrogen.

The primary advantage for use of NPN is cost savings. Use of supplements containing NPN can help you stretch your feed supply. Addition of urea or other NPN sources to a feed supplement allows the effective crude protein level to increase for relatively low cost. Because microbial protein actually utilized by the ruminant animal is the same whether NPN or true protein is utilized, animal performance is maintained. Research has documented that proper use of urea or other NPN sources in healthy, mature ruminants does not result in a decrease in production and in cases of protein deficiency, production is actually increased. However; while NPN can be a great tool for cost savings there are some disadvantages to consider.

We must realize that if fed incorrectly, NPN can be toxic. Toxicity results when ammonia released from NPN exceeds microbes' ability to convert it into protein. Excessive amounts of ammonia enter the blood stream, overloading the liver's ability to detoxify. Rumen pH rises and normal rumen function eventually ceases altogether and death can follow. NPN should not be utilized with lightweight calves, as their rumen microbe populations may not be adequate to properly utilize NPN. Also, calves less than a year old shouldn't receive NPN as a major portion of their diet because the quality of microbial protein formed may be inadequate for their requirements. It also goes without saying that non-ruminants such as horses, pigs, etc. should not receive NPN. The key thing here is that you just need to use NPN properly.

Supplements containing NPN offer an economical solution to increase effective protein in poor quality forages for less cost than "all natural protein" supplements. But there are some precautions. I suggest that you use only one type of protein supplement containing NPN at a time. If you must use more than one type, be sure to balance the ration so that no more than 25-30% of the total crude protein in the entire diet comes from NPN sources to avoid possible toxicity problems. When utilizing free-choice protein supplements containing NPN make sure that consumption is regular and controlled so that cattle don't over consume. Urea or other NPN sources are best consumed in small amounts over a constant period. Slow release of ammonia is preferred. Refrain from feeding NPN to sick cattle that have impaired rumen function (recovering from acidosis or bloat). Also, avoid feeding NPN to weaned calves less than one year old. Do not feed supplements containing NPN to starved cattle, especially starved cows with calves at their side. Starved cows may try to consume greater than recommended levels, plus since milk production will be poor, calves may be forced to consume supplement as a substitute and receive too much NPN. Mature cows in good flesh receiving adequate forages can safely and effectively utilize NPN-containing supplements, even with calves at their side and good milking cows keep calves from ingesting NPN. Do not feed urea-containing supplements to "shipped in" cattle that have been starved for several days. Give them a chance to overcome the stress of shipping and fill up on "all natural protein" supplements before introducing NPN-containing supplements.

The preceding information comes from the research and personal observations of the writer, which may or may not reflect the views of UNL or Nebraska Extension. For more further information on these or other topics contact D. A. Lienemann, Nebraska Extension Educator for Webster County in Red Cloud, (402) 746-3417 or email: [dlienemann2@unl.edu](mailto:dlienemann2@unl.edu) or on the web at: <http://extension.unl.edu/statewide/webster>