

## Putting NPN to work for you

Non-Protein Nitrogen (NPN) - usually in the form of urea- has been used as a source of crude protein in ruminant diets for more than a century. However, the value of this has been questioned due to concerns relating to the mismanaged feeding of urea.

### Reasons to utilise Urea in feed supplements

Urea is a highly concentrated source of nitrogen; it contains the equivalent of 287% crude protein! As Urea provides crude protein in such a concentrated form more space is available for other ingredients which can provide energy or other nutrients.

Forage-based diets often cannot provide enough nitrogen for the rumen microbes. As virtually 100% of dietary urea is degraded in the rumen, it helps meet this need.

Price is always a consideration, and urea is an economical source of dietary crude protein.

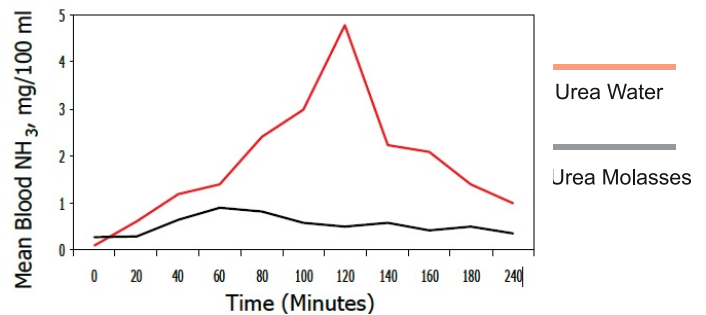
### How NPN contributes to overall nutrition

Through fermentation rumen microbes take in all the nutrients they need, including nitrogen and energy, to grow and reproduce. Volatile fatty acids (VFA) are produced, which the animal absorbs and utilises as their primary energy supply. Dietary NPN sources are readily broken down by the ruminal bacteria and protozoa to yield ammonia. The microbes use ammonia as a key nitrogen source, incorporating the ammonia-N into their single-celled body structures as "microbial cell protein." The net benefit to the host animal comes when millions of these bacterial and protozoal cells flow with the digesta to the small intestine, where the high quality microbial protein is digested, and its amino acids and peptides absorbed. Conditions favourable to microbial growth lead to increasing microbe populations and enhanced fermentation. This allows more feed to be processed (i.e., increased feed intake), with greater volumes of VFA being produced and absorbed, and more microbial cell bodies providing protein to the animal. In forage-based diets, rumen-available nitrogen is typically the microbial nutrient in shortest supply. As dietary NPN provides ammonia-N, the entire fermentation process is enhanced and the host animal benefits from an increased supply of both energy and protein.

## QLF works to optimise Urea usage in 3 ways...

### 1. QLF provides a balance of nutrients to enhance microbial activity:

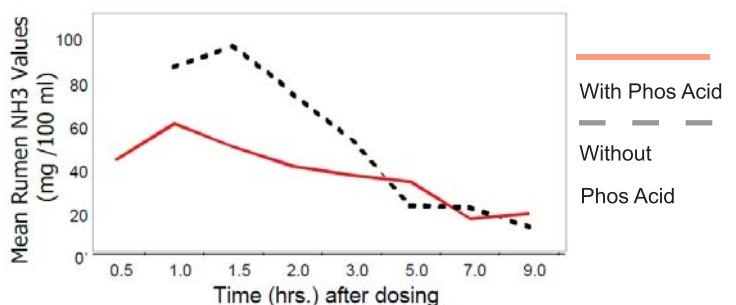
The rumen's bacteria and protozoa need a balanced diet to grow and reproduce. QLF provides a combination of nutrients needed to boost microbial growth including: NPN for ammonia, sugar for readily-available energy, essential macro & trace minerals, and base levels of natural protein



Note in the chart how dramatically ammonia movement to the bloodstream is stopped when molasses is provided along with supplemental urea.

### 2. QLF spreads the supply of ammonia in the rumen over time

The urea in QLF Timed-Release® products has been bound to phosphoric acid, significantly slowing breakdown in the rumen (see chart). This helps match the supply of N to the gradual supply of energy and other nutrients coming from the rest of the diet.



### 3. QLF helps prevent free ammonia leaving the rumen

The movement of ammonia out of the rumen is significantly slowed by acid conditions (low pH). As fermentation activity increases and additional VFA are produced, rumen pH is optimised. Because QLF is designed to enhance the utilisation of forage diets (i.e. increase intake and digestion) via improved microbial fermentation, feeding QLF encourages optimal rumen pH and minimal ammonia movement to the bloodstream.