

# Spotlight on Agriculture

Ministry of Agriculture, Water and Forestry, Directorate of Agricultural Research and Training, Private Bag 13184, Windhoek

No 105 March 2008

## UREA POISONING

The Agricultural Laboratory is occasionally approached to analyse feed or lick in cases where urea poisoning is suspected. It therefore seems appropriate to elaborate on urea with its applications, its advantages and most importantly, its dangers.

Urea is a by-product of an animal's metabolism and as such it is a natural ingredient of saliva and the digestive process. Urea is also an industrial by-product which can be and is successfully added to ruminant rations, but not to feed given to non-ruminant animals such as chicken and pigs. Urea is a chemical substance, 46,7 % of which consists of nitrogen. The microbes in the rumen are able to utilise this nitrogen to build their own body protein. Further down in the digestive tract the microbes are, in turn, digested and their body protein utilised by the animal. Urea can therefore be fed to ruminants as an economical replacement as part of the protein ration.

The amount of urea a ruminant animal can utilise depends on the digestible energy or total digestible

nutrient contents of a ration. Under practical conditions it is recommended that the quantity of nitrogen derived from urea should not exceed one third of the ration's total quantity of nitrogen.

It has repeatedly been demonstrated that sheep, goats and cattle on low quality roughages such as dry pastures, which are feeds high in fibre and low in crude protein, can gain considerably from urea applications. The inclusion of urea into many commercial ruminant licks leads to a better utilisation of the roughage. Licks compensate for deficiencies in the basic diet by including urea and other supplements. Consequently, additional feeding of this kind enhances overall animal health and performance.

However, urea applications are not without risks. One of the chemical reactions of urea is a release of ammonia. If too much ammonia is released within a short period, the ammonia levels in the blood rise and become toxic and the pH in the rumen simultaneously rises to such an extent that the rumen ceases to function normally.



Such urea poisoning (or toxicity) is characterized by uneasiness, tremors, excessive salivation, rapid breathing, incoordination, bloat and tetany. These symptoms usually occur more or less in the order listed. Tetany is the last symptom before death occurs. Treatment of urea poisoning is often successful if it commences at an early stage. In cases of urea poisoning, access to the feed should be stopped immediately. Cattle should be drenched with four to five litres of vinegar and small stock with about one litre of vinegar. Acetic acid furnished by the vinegar lowers the rumen pH and neutralizes ammonia, thus preventing further absorption of ammonia into the bloodstream.

**However, it is most important that urea poisoning should be prevented rather than cured.**

Always keep the following in mind:

- Be aware of the dangers of urea feeding.
- Do not mix urea into feeds without consulting an animal nutritionist.
- If feed contains urea, ensure that it is well mixed.
- Check that the urea does not form clots.
- Adapt animals to urea feeds according to the directions on the packaging.
- When depriving animals temporarily of urea feed, they might eat greedily once they regain access to it, and



consume too much within too short a period; rather reintroduce the feed slowly.

- Prevent urea feed from getting wet, for example, from rain (urea forms nitrate, which will become toxic once it is changed to nitrite in the rumen)
- There are other sources of non-protein-nitrogen (NPN) that do not contain urea, for example biuret, ammonium phosphate and ammonium sulphate.

**In most cases when urea toxicity is experienced, more than one of the above recommendations has been neglected. So, be aware, prevention is better than cure!**



**References:** Stanton, T.L. & Whittier, J., 2007. *Urea and NPN for Cattle and Sheep*. <http://www.ext.colostate.edu/PUBS/LIVESTK/01608.html>, Colorado State University Extension.

Van der Merwe, F. J. & Smith, W.A., 1991. *Dierevoeding*. Kosmo Uitgewery, Stellenbosch.

**Author:** W.K. Nauhaus, Directorate of Research and Training, Agricultural Laboratory, Private Bag 13184, Windhoek, Namibia.

**Photographs:** W.K. Nauhaus (see above).

**Content Editor:** Paul van der Merwe, Directorate of Agricultural Research and Training, Ministry of Agriculture, Water and Forestry, Private Bag 13184, Windhoek, Namibia.

**Language Editor:** Celia Mendelsohn, [celia@scouts.org.na](mailto:celia@scouts.org.na).