# A new look at urea

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*Urea is not necessary in the diet of ruminant animals, but, because of the ruminant's unique ability to utilise the nitrogen from urea to form high quality microbial protein, urea can be fed as a replacement for part of the protein in a ration.*

**Introduction**
Urea is a simple compound that contains 46 percent nitrogen. It is found in many plants and is a normal end product of protein metabolism in mammals. A part of the urea produced in the animal body is returned to the digestive tract in the saliva. The remainder of the urea is passed off in the urine as waste.

**How is urea used by animals?**
Urea, a non protein nitrogen compound, is used by the bacteria in the rumen of cattle and sheep. During the normal fermentation process, urea is broken down to ammonia. Micro-organisms in the rumen combine the ammonia with products of carbohydrate metabolism to form amino acids and hence, proteins. The proteins that are formed from NPN compounds are similar in amino acid content to the proteins available to the animal when the principle source of dietary nitrogen is intact protein.
The bacteria and protozoa, and the protein they contain, are digested by the ruminant animal further down the digestive tract. In this manner the ruminant animal can make use of certain NPN compounds even though it does not possess enzymes of its own for their breakdown.

**Protein supplementation in the dry season**
Fertility of a cow is directly linked to the condition of the cow. It is well known that animals grazing low quality (protein content lower than 6 %) dry roughage during the dry season lose weight. To minimize the weight loss and to ensure that cows are in as good as possible condition at the end of the dry season, dry grazing must be supplemented with a protein lick Although animals grazing low quality roughage have a relatively high maintenance requirement in terms of energy (because of the cold and windy conditions as well as the activity to move around to graze), energy is not the main nutrient supplemented during the dry season, but rather protein. This is because although energy is the primary factor limiting animal performance on dry grazing, protein intake is the primary factor that influences energy intake and utilization.

**Sources of Protein**
There are many different raw materials that can be used to supplement protein to animals. The most commonly used sources are the different oilcakes and then of course urea. When urea is used there are a few factors that can influence the efficient utilization thereof.

**Sources of readily available energy** – The most important factor that can influence the amount of urea that can be used by a ruminant is the digestible energy or

total digestible nutrient (TDN) content of the ration. Rations that are high in digestible energy such as rations with a high grain content, result in good utilization of urea, where as rations that are low in digestible energy such as high roughage diets, result in a lowered utilization of urea. The addition of grains or molasses products to a lick, will therefore increase the utilization of urea when urea containing licks are given to animals grazing low quality roughage.

**Frequency of feeding** - A daily intake of urea will allow for a constant or continuous intake of urea and will improve the utilization of urea over abrupt or periodic intakes.

**Levels of urea** – Low levels of urea are utilized more efficiently and with less problems than high levels.

**Adequate supply of phosphorus, sulphur and trace minerals** – When natural proteins are substituted by urea, the quality and quantity of minerals available to ruminal bacteria and cattle changes sharply. Although minerals are only needed in small quantities, these elements are necessary building blocks for microbial protein synthesis. It is therefore important to add additional trace minerals to a lick.

With all of the above taken into account, the following licks can be mixed on the farm. The licks contain a safe amount of urea with all the necessary energy, minerals and trace minerals (contained in Kimtrafos 12 Grande) for the optimal utilization of urea to supply your animals with the protein they need to utilize the grass. By doing so weight loss is minimized hence animals will be in a good condition at the end of the dry season.

**Table 1 Winter maintenance licks containing urea**

| **Raw materials** | ***Without oilcake Early dry season*** | ***With oilcake Early dry season*** | ***With oilcake Late dry season*** |
|---|---|---|---|
| Maize meal | 250 | 250 | 300 |
| Oilcake | - | 150 | 300 |
| Feed Grade Urea | 150 | 100 | 100 |
| Kimtrafos 12 Grande | 150 | 100 | 75 |
| Kalori 3000 or Molassesmeal | 50/80 | 50/80 | 25/40 |
| Feed Grade Sulphur | 7 | 5 | 5 |
| Salt | 350 | 350 | 300 |
| **Total** | **957** | **1005** | **1105** |
| **Intake (g/cattle/day)** | **350 - 500** | **350 - 500** | **500 – 600** |
| **Intake (g/sheep/day)** | **-** | **80 - 120** | **150 - 170** |