

Choose the correct premix for your ruminants

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Ruminants are amazing animals as they are the only mammals that can live on roughage alone. To do this, they have three additional compartments in their stomach which break down feed before it reaches their abomasum or 'true stomach'. These extra compartments house billions of microbes that digest fibre and convert it into biological compounds the animal can utilise. Without this microbiome, ruminants would not be able to utilise fibre.

Now for the most important facet of ruminant nutrition: We feed the microbes first, and then the animal itself. Just like the animal, these microbes require nutrients such as energy, protein, vitamins and minerals. The composition of a premix for ruminants is therefore complex as the requirements of two living systems must be considered.

Researchers have been incorporating new research into models that predict animals' requirements for years. Given the development in computer and research technology, today's required estimations are very close to reality. An updated publication is released every few years for specific species, so it's best to rather leave the intricacies of premixes to the animal nutritionist. However, it is good to have some understanding of the overall picture and how to interpret it.

The focus of this article is macro-premixes where macro-minerals are added to micro-minerals, vitamins and additives, making it unnecessary to weigh and add small amounts of macro-mineral sources such as salt, feed lime and monocalcium phosphate at farm level.

Production stage

Pregnant animals have a higher requirement than dry animals. A growing foetus means more nutrients are needed. Rapid foetal growth occurs especially during the last three months of gestation. Milk production starts post birth – it is hard work that becomes even more difficult

Table 1: Differences in calcium, phosphorus and zinc requirements of a 70kg ewe during different production stages. (Adapted from: Small Ruminants NRC, 2007)

Production stage	Calcium (g/day)	Phosphorus (g/day)	Zinc (mg/dag)
Maintenance/dry	2,4	2,6	35,5
Early lactation – single lamb	5,9	5,5	66,5
Early lactation – twins	7,9	6,9	87,5
Early lactation – triplets	9,8	8,5	103

where multiples are involved. A ewe with triplets, for example, has her work cut out for her, and without extra attention she will not excel (*Table 1*). The same applies to cows, with dairy cows having to produce the maximum possible amount of milk for ten months.

Replacement animals need fewer nutrients than those being finished, as the desired growth rate is much lower. The greater the production expectation, the more nutrients must be provided.

Age of the animal

Because young animals are actively growing, their requirements are much more extensive than those of mature animals. When it comes to premixes, skeletal development is important. Calcium, phosphorus and magnesium, which comprise the majority of the skeleton, are therefore a priority. To be effective, however, these macrominerals must be supported by microminerals and vitamins. Furthermore, young animals must build up their own immune system, which requires minerals and vitamins.

Types of feed and grazing

A distinction is made between total mixed rations (TMR) and lick supplements. With a TMR, which includes roughage, the microbiome is taken into account, although the emphasis is on the animal that must produce optimally by utilising the expensive raw materials in the feed.

Where licks are concerned, the emphasis is on the microbiome as the main purpose of a lick is to facilitate maximum grazing/

roughage usage. Licks must include the correct phosphorus levels, as most soils in South Africa are phosphorus deficient. Different approaches are therefore taken in terms of TMRs and lick premixes.

Grazing can be divided into green, transitional and poor/dry. To get the most out of grazing, it is important for fibre-digesting microbes to function optimally and therefore obtain the correct minerals and vitamins from the premix. Calcium, phosphorus, magnesium and sulphur are the key components in green grazing. The same minerals are necessary in transitional grazing, but in different proportions.

Next in line is a non-protein nitrogen (NPN) source such as urea, as fibre-digesting microbes build their own protein from nitrogen. However, sulphur must be included in the right proportion to NPN. As poor/dry pasture lacks protein, more NPN and sulphur are required.

Species-specific requirements

Each species has its own vitamin and mineral requirements. For instance, guard against copper poisoning if beef cattle premixes are given to sheep. Sheep have a tendency to develop bladder stones which means their premixes usually contain ammonium salts as a preventive measure. **SF**

The composition of premixes is a complex field. The correct premix can facilitate maximum utilisation of nutrients. Talk to your nutritionist or send an email to Sjoerd ten Cate at sjoerd@feedtek.co.za.