

## NUTRIENT FEED BLOCK SUPPLEMENT FOR GOATS AND CATTLE

Multi-nutrient mineral blocks are lick blocks containing energy, protein, vitamins, minerals and other nutrients. The feeding of the blocks is a convenient and inexpensive method of providing a range of nutrients required by both the rumen microbes and the animal, which may be deficient in the diet. Strategic ruminant supplementation is one of the technologies to reduce methane gas which is also responsible for global warming.



**Nutrient Feed Blocks**

### Why Blocks?

Supplementation systems based on liquid molasses are difficult to use under extensive or intensive livestock production systems. The main reasons are the necessity to have a minimum of infrastructure to transport and distribute the liquid mixture (tanks for transport and storage, feed troughs etc.) and the difficulty to manipulate this by-product, which is a very viscous and sticky liquid. Therefore, in many countries where there is a surplus of molasses it is either under utilised and, or, exported even when there are problems in animal feeding during the dry season.

### What are the basic feed ingredients of the blocks and what nutrients do they provide?

The choice of the ingredients will depend on their availability, nutritive value, price, ease of handling and

the effect on quality of block. Some of the ingredients that may be used are: molasses, urea, bran (rice, wheat or maize), oilseed meals and cakes (soybean, sunflower, groundnut, cottonseed cake), agro-industrial by-products and miscellaneous non-conventional feeds (citrus pulp, cassava waste, milled groundnut shells, brewers grain, bagasse and poultry manure), cement or lime, mineral powder and minerals.

### A standard block consists of:

#### 1. Molasses

Molasses is a major by-product of the sugarcane industry. It is a good source of energy and a widely available concentrated form of 'fermentable carbohydrate' that has no role in human nutrition. Because of both its taste and smell molasses makes blocks appetising for animals.

#### 2. Urea

Urea is a product, which after hydrolysis into ammonia in the rumen can be used as a nitrogen source by the microbes. Therefore, a supplement containing molasses and urea can stimulate the development of microbes in the rumen, permitting a better digestion of the forages and a greater production of microbial protein, which could provide essential nutrients in the intestine..

#### 1. Cereal bran

Cereal bran such as rice, maize or wheat bran are high in phosphorus, trace minerals and also a range of vitamins. They absorb moisture from the molasses and gives structure to the block. Bran can be replaced by other sources of fibre such as bagasse or finely milled groundnut hulls.

#### 2. Oilseed meals

Oilseed meals provide both soluble and insoluble proteins and are a good source of phosphorus. It is appropriate to add such ingredients when blocks are given to animals in production.

### Major ingredients in a MNB

Ingredient	Quantity (kgs)
Molasses	30
Maize, rice or wheat bran	12
Cotton seed cake	15
Poultry litter	8
Cement, cassava flour, clay soil (as a binder)	6
Dry Sweetpotato peels	4
Sweetpotato hay	4
Mineral powder	8
Calliandra leaf hay (or any other leguminous hay)	6
Dry chopped grass	7

Estimated cost per kg-block = 1,500 Ug shs  
(1 US \$ = 1740 Ug shs)

#### 3. Cement, clay soil or cassava flour

These are used as a binding agent. The use of cement has raised questions about possible harmful effects on the animals but studies in USA, USSR and Canada have shown no negative effects, over long periods of time, when it constitutes up to 1 % of the total daily intake of dry matter.

#### 4. Mineral powder

Mineral powder provides much of the macro mineral requirements (sodium, potassium, calcium and phosphorus) of the microbes as well as those of the host animal.

#### 5. Calliandra leaf hay

Calliandra leaf hay has well balanced amino acids that are protected from degradation in the rumen. It therefore enhances microbial protein fermentation, digestion and improve feed efficiency

### How to manufacture the blocks?

Manufacturing can be divided into 5 stages:

1. Preparation of feed ingredients
2. Mixing
3. Moulding

4. Turning or cutting out (optional, based on the method adopted)
5. Drying

### Preparation of feed ingredients

All components should be weighed out before mixing. A standard volume or weight can be adopted for each component which would correspond with the weight of the block desired. For example, if each block is to weigh 5 kg and at each mixing 50 blocks are to be produced (a total of 250 kg), then assuming that the feed ingredients available are molasses, urea, maize bran, soybean meal, binder and mineral powder, then the following formula can be used to prepare the components for mixing. Double the quantity if each ingredient will be required for 100 blocks.

### Equipment for mixing

Different types of mixers can be used. If adequate labour is available and only few blocks (say 50-150) are needed then manual mixing is possible. With 3 labourers and one supervisor, approximately 150 blocks of 5 kg each could be made over a period of 8 hours. However, a concrete mixer is recommended for producing over 150 blocks/day. The cylinder of this concrete mixer should turn horizontally and as slowly as possible, to avoid the molasses, which is highly viscous, sticking to the side of the mixer. Spillage of the mixture should also be avoided.

### Introduction of the components

The order of introduction of the components plays an important role in the mixing process. The recommended order is as follows: (1) Molasses; (2) Urea; (3) Salt, minerals etc.; (4) Binder (Cassava flour, lime or cement); (5) Maize, rice or wheat bran; (6) Cotton seed cake or sunflower cake; (7) Calliandra leaf hay and (8) Grass hay

Following this order a homogenous mixture of the urea, salt and gelling agent in the molasses is assured. Any other components (e.g., minerals, drugs) to be included are introduced together with the mineral powder. When using a concrete mixer the bran must be introduced in small quantities at a time, in order to ensure a homogenous mix. After a few minutes, when the mixture appears homogenous, rather like peanut butter, the mixer

is emptied (e.g. into wheelbarrows if large scale production is being undertaken) and the mixture transported to the moulding area.

### Moulding

Moulds are necessary to set the blocks in an acceptable shape. Once set the frame can be removed for reuse and to allow the drying process to continue. The size of the mould will depend on the preferred size of the block(s). The most appropriate for small scale manufacture of blocks are frames made out of a number of wooden planks with slots cut to enable easy assembly and removal. Each compartment measures 25 x 15 x 10 cm and can hold a urea-molasses block weighing 4.5-5.0 kg.



This type of mould is most suitable when drying and storage area is limited. Small plastic containers have been used successfully for preparing the blocks. They produce blocks with acceptable solidity and are suitable for use in small units. An advantage of this type of mould is that the block can be offered to the animal while it is in the plastic container and once the block has been consumed the container can be re-used.

### Mixer and molding machines

#### Turning out and cutting the blocks

Turning out and cutting is necessary when using large quantities of ingredients. The board can be taken away the day after moulding in order to facilitate drying. The cutting will take place later with a flat spade. The spade should be wetted in a bucket between each cut to avoid the mixture from sticking to it. With small plastic moulds, the blocks can be offered to animals while in the mould or the blocks may be removed simply by turning the

containers upside down and tapping on the bottom of the container.

### Drying

After removal of the moulds and cutting up, blocks are arranged on a drying area. **Blocks must not be exposed to direct sunlight, but placed under a shade with good ventilation.** After 24 to 72 hours the blocks are dry enough to be transported.

### How do you utilize Multi-nutrient blocks?

The blocks must **not be fed alone but only as a supplement.** They require a minimum amount of roughage to ensure that the animals are not over fed and thereby avoid urea poisoning. Remember that the purpose of the block is to improve the utilisation of roughage and not to substitute it.

### Species of livestock

Because the blocks contain urea they must **only be fed to ruminants** (buffalo, cattle, goats and sheep) and **NEVER** to monogastric species (chicken, donkeys, horses, pigs, rabbits) or to young, especially pre-ruminant calves, kid goats and lambs.

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