**Lecture 8**

**NUTRITIONAL DISORDERS IN RUMINANT ANIMALS**

Ruminant animals have been noted to possess capability to utilize or convert waste resources into beneficial products such as meat, milk, hair among others. This is feasible as long as the animal is provided with good housing, feeding and hygiene. A number of nutrient related metabolic diseases have been studied under experimental conditions with ruminant animals. They include dysphagia, abortion, ketosis, enterotoxaemia, milk fever, urinary calculi, toxic plants etc. These diseases are always related to the absence of one or many nutrients from the feed given to the animals. It may be as a result of inadequate feeding of animals resulting in Marasmus otherwise known as malnutrition. This may eventually lead to more complex situation resulting from generalized starvation of the animal. At times, the animal may be fed adequately but with the feed lacking a major nutrient as in Kwashiorkor otherwise known as prolonged insufficient intake of protein. In this case, there is a negative nitrogen balance because the nitrogen output exceeds that of input. The rate of tissue breakdown therefore, becomes accelerated. In some cases, a minor nutrient may be lacking as we have in the following diseases:

1. **DYSPHAGIA:** Ruminant animals during grazing are sometimes being observed to consume or lick materials which in nutritional terms are INERT materials. Such could be manifested as the licking of bones, stick, paper eating as well as soil eating. These behavioral symptoms are traceable to deficiencies of phosphorus in the diet of such animal. Such phosphorus deficiency could be aggravated by an inbalance in calcium: phosphorus ratio (Ca: P) or an excessive demand of the animal for calcium altering the Ca:P ratio from the normal of between 1.5:1. If the situation is not properly managed, the material which is consumed or licked could harm the animal. The disease dysphasia also results in metabolic symptoms similar to those of phosphorus deficiency which include.
2. Muscular weakness
3. Low fertility and
4. Low productivity

The practical and effective solution to the menace of dysphagia on the farm is:

* Introduction or inclusion of adequate amount of phosphorus in the diet.
* The Ca:P ratio of ruminant ratio should always be kept between a range of 1.5:1 to 2:1

1. **ABORTION:** This is a condition which results in the expulsion of life or dead foetus by pregnant animals. Among several factors, nutrition stands out as a major cause. In pregnancy, the foetus develops over time and this calls for increase calcium, phosphorus and other nutrients. When the feed is unable to supply required quantity of these nutrients, the foetus development is affected and may be expelled. The level of blood glucose is also very important in this condition. When an animal is under-fed, the glucose level in the blood becomes lowered and the animals become depressed. There is an elevated/increased production of estrogen. Arising from this, the foetus could be expelled. This is more frequent when the pregnancy is in second trimester, usually between 90 – 110 days in cows.
2. **ENTEROTOXEAMIA:**  This is a metabolic disorder that is otherwise referred to as over-eating disease or toxic indigestion. It brings about diarrhoea, digestive in coordination (staggering or gait), coma and eventual death of the animal. Enterotoxaemia may result from a change in the feed of the animal resulting in consumption of more palatable and digestible feed by hungry animals. It can also be caused by Ca insufficiency in diet as well as acidosis. The disease can also be built up as a toxic reaction to the micro organism *Clostridium perfrigens*. Enterotoxaemia condition can be prevented by frequent feeding of palatable feed such as milk, concentrate and succulent forages as well as hay in small bits at a time.
3. In other words, offering of large quantity of milk or concentrates to animals at a time should always be avoided.
4. When changes are to be made to concentrate feed to ruminant animals, a gradual introduction is recommended over a number of days. This is more relevant when urea is to be introduced to the animal at the first time and at high level. In this case, the animal may need a minimum of 3 weeks to adjust.

A situation referred to as Lactic acidosis could result when the PH level in the rumen drops to about 4.8 and this only favours a specific class of micro organisms.

1. **KETOSIS:** This is a nutritional condition in which there is an increase quantity of ketone bodies in the blood of animals. Such ketore bodies include acetone, aceto acetic acid, B-hydroxylbutyric acid. When their levels increase in the blood or milk, the metabolic disorder is referred to as Ketosis. Ketosis can also be associated with increase level of non-esterify fatty acids in the plasma since these are known to be the precursors of Ketone bodies. This condition is very common in dairy goats and cows that are high yielding, in which case it is referred to as LACTATION KETOSIS. Pregnancy ketosis also occurs in pregnant cattle, sheep and goat that are carrying multiple fetuses. Ketosis could be controlled and prevented by intravenous administration of glucose and adreno-curticotropic hormone or gluco-corticoid steroids.
2. **MILK FEVER:** This is otherwise referred to as *Parturient* *paresis* because it manifests soon after parturition, as an increase in the blood flow to the mammary gland. In high yielding animals, milk fever could be caused by a drop in calcium level. Consequently, the disease could easily be treated by introduction of calcium into their diets. It could also be treated through vitamin D therapy i.e. administration of Vit. D Milk fever is not common where milk production is less intensive.
3. **URINARY CALCULI:** This disease is associated with stone formation along the urinary tract which endangers or brings about infection of the urinary tract. With the formation of stone there is the blockage of the urinary tract. It is more noticeable in confined animals than those which graze from time to time. This condition occurs more in males and can be associated with high feed phosphorus relative to Ca:P content of the feed. The ideal Ca:P is 1:5:1 for ruminant animals and when this is not conformed with the tendency is for the animals to start building up little stones progressively along the urinary tract. Thus, the best antidote against urinary calculi is a balanced Ca:P ratio particularly in zero-grazed animals.
4. **UREA TOXICITY:** This disease refers to in ability of ruminant animals to cope with excess level of urea in their feed supplements arising from which large quantities of ammonia is produced resulting in brain derangement. It could also occur or manifest when such a feed does not possess sufficient quantity of readily available energy to cope with the rate of ammonia release. To prevent this disease, therefore
5. The urea level of feeds must be reduced or kept at minimum
6. Acid infusion into the rumen has been used in many cases to counter the effect of urea toxicity.
7. **TOXIC PLANTS:** Much as it is being advocated that ruminant animals should always be grazed on forage for economic production, one needs to note that some plants are very toxic and can instantly result in death of animals. Such reaction is usually derived from the content of anti metabolite or toxins in the leaves of plants. Under normal condition, these toxic constituents are used as protective mechanisms by the plants themselves. The outstanding examples are:
8. Hydrocyanic acid (HCN) contained in the leaves of high cyanide variety of cassava.
9. Tannins found in almond leaves
10. Tannins found in sorghum
11. Nitrate and Nitrite in some leaves as well as oxalate and phytate.

These toxicants influence the bio-availability of Ca, P, Mg, Cu, Zn, Mn, Co etc i.e. Minerals. Cases have been cited of goats that died within 3 hours after consuming cassava leaves. Such effects can however, be overcome through.

1. Wilting or partial drying
2. Inclusion of sulphur to assist in detoxification
3. When some of the effects are noticed which may include foaming in the mouth or prostration, palm oil could be administered to assist in reducing the surface tension of the rumen environment.
4. **BLOAT**

Bloat is the manifestation of accumulation of gas in the reticulo-rumen due to the rate of gas elimination falling behind the rate of gas production. In legume bloat for example, the primary abnormality responsible for inefficient gas elimination is excessive frothing of the gastric contents. Some frothing of the reticulo-rumen contents always occurs when succulent legumes are ingested, but this foam is not always of the required consistency or sufficient in amount to cause bloat. Occasionally, however, the frothing is of such magnitude that there is a large increase in the volume of stomach contents and a change in their physical characteristics, and bloat results. Gas elimination is impeded by the trapping of gas in the foamy digesta, by interference with the access of free gas to the cardiac, and probably by reflex inhibition of oesophageal components in eructation. In the bloating animal, frothy digesta may enter the oesophagus only to be swallowed again; in effect, the foam is returned in the stomach until the former collapses.