



Phytotoxins in Ruminants

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Kerala especially the western ghat region is famous for its biodiversity. Different types of plants are prevalent in this area. Increased population density and land pressure have resulted in many ecological and environmental problems. There are different species of plants that are common in Kerala and for which reasonable evidence of toxicity is reported. Many instances of general malice, in appetite, allergic manifestations, dullness, etc. for which the local veterinary practitioner is called to deal and the cause of which is seldom diagnosed could be due to consumption of subclinical doses of harmful plants.

Cyanogenic plant poisoning

Many plants are reported to contain cyanogenic glycosides. Two important sources are cassava and rubber trees. Trees/plants like Acacia, Eucalyptus, mimosa, sorghum, etc. are also reported to contain cyanogenic glycosides.

From cyanogenic glycosides hydrocyanic acid is produced by the action of appropriate enzymes which may be present in the same plant or other plants or by activity of rumen microflora.

Horse and pigs are less susceptible as the acidity of stomach destroys the enzyme.

Mature plants contain smaller amounts of glycosides than younger plants. Drying, hay making, chilling etc reduces the chances of toxicity. Application of nitrogenous fertilizers increases the amount of glycosides in plants. Plants containing more than 200 ppm is likely to be toxic. Rapid consumption increases chances of poisoning. Continuous exposure leads to development of tolerance.



Acute condition causes histotoxic anoxia and resultant tissue asphyxia by inhibiting oxidative enzymes such as cytochrome oxidase. The oxygen of arteries of blood cannot be utilized and therefore venous blood retains the bright red colour of oxyhaemoglobin. Cyanide ingested in small amounts could produce goiter in lambs that are not supplied with adequate iodine.

Large amounts of hydrocyanic acid cause death almost instantaneously with spasms and respiratory paralysis. Small doses cause a short period of initial stimulation associated with excitement and convulsions. Depression then occurs. Respiration becomes deeper and is accelerated, later become weak and irregular before final ceasing. The eyes are prominent, staring and non-sensitive to light. Pupils dilated, nostrils and mouth may be filled with foam. Involuntary urination and defecation often occurs.

Weakness, twitching and staggering are followed by inability to stand. When animals are down they may assume a position like that seen in parturient paresis. In the final stages animals lie on the side and there is marked dyspnoea.

The salient postmortem findings are bright red/dark red coloured blood, slow clotting of blood, congestion and hemorrhages in upper respiratory tract and bitter almond smell to rumen contents.

Diagnosis is by history, clinical signs and picric acid test for suspected plants/ruminal contents. The con-



dition has to be differentiated from pulmonary emphysema, nitrate poisoning and anaphylaxis.

Intravenous administration of a 10% solution of sodium thiosulphate @ 660 mg/ kg body weight is an effective treatment. Oral / intraruminal administration of 30 grams of sodium thiosulphate will help in fixing the free hydrocyanic acid in the rumen.

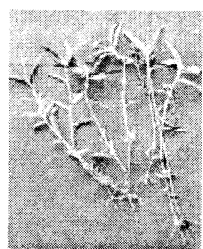
Chela leaf (*Ficus tsiela roxb*) poisoning

Leaves of this tree are used for manuring paddy fields. In summer season due to scarcity of green leaves cattle may feed on these leaves.

The predominant symptoms are dullness, depression, inability to hold the head straight, excessive salivation, intermittent tonic convulsions, nystagmus and frequent bellowing. Hyperaesthesia is also observed. In some cases there will be inter mandibular edema, muscular tremors and profound bellowing.

Post mortem lesions include slightly enlarged and scattered areas of necrosis in hepatic parenchyma. Edema and demyelination of brain is detected in histopathology. The toxic principles have not been identified. The line of therapy is symptomatic.

Mimosa invisa (*Anathottavady*) poisoning



Mimosa invisa is a cover crop of plantations. It is the most common poisoning condition encountered in Kerala at present. The clinical signs are not well defined in the early stages. The early signs are small quantities of feed intake, inappetence, weakness, reduced rumen motility. Anorexia and loose dung with presence of mucus and blood are observed in the subsequent days. Pronounced perineal oedema occurs towards the later stages.

Post mortem findings include severe diffuse oedema of retroperitoneal region, swollen kidneys with echynotic patches and diffuse congestion of intestinal mucosa. The plant may contain toxic factors other than mimosine which are to be identified. The treatment followed is supportive and symptomatic.



***Glinus oppositifolius* (Kozhuppa) poisoning**

This is a weed that grows abundantly in paddy fields during certain seasons. Plants that grow during the pre-monsoon period are more toxic. Symptoms in poisoning are intermandibular edema, tremors, posterior in co-ordination, ataxia, stupor leading to delirium, exaggerated respiration, congested mucous membrane, dry muzzle etc are also detected. Alternatively signs such as depression, anorexia, tympany and cessation of rumination are also reported.



The toxic factors were identified as triterpene glycosides. Large doses of atropine sulphate were found to be effective in nullifying the toxic effects.

Lantana (*Poochedy*) poisoning

Lantana poisoning occurs during periods of draught and food shortage. The condition may manifest in acute and chronic forms. The clinical signs in acute condition include weakness, reduced feed intake, dung becomes soft with blood and paralysis. In chronic form, constipation, jaundice, photosensitization, edema of head and face and keratitis may occur.

The toxic factor in the plant has been identified as Lantadin that is hepatotoxic and nephrotoxic. The line of treatment is supportive and symptomatic.

Certain other plants that are reported to be toxic to ruminants are abrus (Kunni), ricinus (Avanakku), *Nerium oleander* (Kolambi) gossypium, subabul (*Leucenia leucocephala*), bracken fern and sweet clover. Poisoning due to these plants are rarely reported from Kerala.



SOME HARD FACTS

- 38% of the doctors in us are Indians
- 12% of the scientists in us are Indians
- 28% of IBM employees are Indians
- 17% of Intel employees are Indians
- 34% of Microsoft employees are Indians
- 13% of Xerox employees are Indians

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