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## Acute poisoning of *Acacia leucophloea* in goat and cattle at Narharpur district of Bastar Chhattisgarh

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#### Abstract

Harsh and drought weather conditions like autumn and summer which have been favourable for a certain kind of poisoning that can affect animals on pasture. Hot arid weather followed by warmer temperatures favours scarcity of fodder plants so during scarcity period animal goes towards the toxic plants which is generally highly palatable in nature. The major plant parts that caused poisoning were leaves as these parts are easily accessible and repeatedly fed by animals. Present qualitative chemical analysis was carried out obtained from the feed and rumen liquor sample was collected from the one cattle and twelve goat died from the acute poisoning of *Acacia Leucophloea* received from Narharpur District of Chhattisgarh. For this rumen contents and forages was preserved in the frozen condition until analysis. History revealed that the animals were accidentally grazing in the field where *Acacia Leucophloea* planted. The clinical symptoms were per acute to acute. Digestive disturbances, Dyspnoea, difficulty in breathing, cytotoxic anoxia, respiratory failure often resulting in death less than one hour after ingestion. Post-mortem examination revealed bitter almond smell and qualitative laboratory analysis of rumen liquor also showed presence of hydrogen cyanide which indicated that cause of significant morbidity and mortality in a herd of twelve goats and one cattle after exposure to plant *Acacia leucophloea*. It is concluded that Phytotoxicity is commonly occurring and challenging health of livestock. The findings this analysis suggest that picrate paper test for cyanide and Dragendorff reagent and/or Mayer test could be used as field test for qualitative evaluation for alkaloid in rumen liquor and feed sample also feed and fodder, pasture of animals should be properly monitored for absence of any fungal growth to minimize the risk of enforced consumption of livestock on poisonous plants due to feed shortage.

**Keywords:** anoxia, *Acacia leucophloea*, cattle, goat, hydrogen cyanide, poisoning

#### Introduction

Plants are the major source of feed for herbivorous animals and also used for the treatment of many diseases (Bah, 2013) [2]. Numerous poisonous plants have known to cause negative impact on the livestock industry. Grazing is considered as normal routine in livestock management, but it exposes the animals to a variety of poisonous plants particularly when there is a reduction in fodder availability. The common poisoning seasons were at the end of rainy season and during drought time. For most of the plant poisoning cases the treatment is general with symptomatic and supportive therapy since there is no antidote for most poisons (Mekonnen, 1994) [9]. Delay in treatment and unattained cases may lead to loss of animal, partially or completely. Toxin specific antibodies are available for treating several plant toxicity. Unfortunately, due to the high costs and scarce availability of these antidotes veterinarians may not have ready access to all of those that are clinically useful in managing plant toxicity

*Acacia leucophloea* (Roxb.) wild. (Leguminous Mimosoidae) is an important dry-season fodder and pasture tree throughout its range. Leaves, tender shoots and pods are eagerly eaten by goats, sheep and cattle. Singh (1982) [11] and Tiwari *et al.*, (1998) [13] reported that leaves contain 15% crude protein and 19% crude fibre. Hydrocyanic acid content is the major constraint to use it as sole fodder (Bhadoria and Gupta, 1981) [3]. These plant species is being eaten by a large number of domestic animals. All domestic animals are susceptible to the effects of cyanide and alkaloid poisoning; however, due to their diets ruminants are usually more commonly affected than others (Djogo, 1992) [5]. Cyanogenic glycosides are found in and naturalized plants throughout the Nararpur, Baster Area (C.G.). The glycosides themselves are not toxic, but they yield hydrogen cyanide (hydrocyanic or prussic acid) when they are hydrolysed by  $\beta$ -glycosidases, either as a result of injury to the plant cells or by microbial

action in the rumen. Hydrogen cyanide is readily absorbed from the gastrointestinal tract. Cyanide ion binds with iron in cytochrome oxidase, interfering with cellular respiration. (Abriham *et al.*, 2015) <sup>[1]</sup>.

## Materials and Methods

### Sample of plant material

Sample was collected from the one cattle and twelve goat which died from the acute poisoning of *Acacia Leucophloea* received from Narharpur District of Chhattisgarh.

### Toxicological analysis (Qualitative analysis)

#### Test for alkaloids

0.4 g extract of each plant was mixed with 8 ml of 1% Hydrochloric acid, warmed and filtered. 2 ml of each filtrate was titrated separately with (a) Mayer's reagent and (b) Dragendorff's reagent, Yellow precipitation for Mayer's reagent, Red precipitation for Dragendorff's reagent was observed to indicate the presence of alkaloids.

#### Test for HCN in the sample

5 g of extract sample is taken test tube and moisten it with some amount of distilled water and a few drops of chloroform is added. Picrate paper was suspended in the test tube with cork. The test tube heated gently over the flame and kept for 24 hrs. for observation. There is change in the colour of picrate paper from yellow to reddish brown or brick red colour which indicates the presence of cyanide in the sample.

#### Test for nitrate and nitrite in the sample

0.5 ml of test reagent Diphenylamine taken in on a clean glass slide and 0.5 ml of sample is taken and to be tested and allow the two to join by air blow or slight tilting. There is no development of blue colour which indicates the absence of nitrate or nitrite in the sample.

## Results and Discussion

Phytochemical test provide an empirical basis for identification of toxic compounds which is responsible for plant toxicity. Phytochemical analysis of present study revealed the presence of HCN and Alkaloids (Raaman, 2006) <sup>[10]</sup>. The finding of this study is also agreement with the (Bhadoria and Gupta, 1981) <sup>[3]</sup>. Poisoned animals showed laboured breathing, dyspnoea, restlessness, tremors, terminal clonic convulsions and opisthotonus are the clinical signs shown by the intoxicated animal. This study also revealed that bloating and other GIT disturbances were among the frequently manifested signs by poisoned livestock. It might be due to the level of toxicity increases depending on the factors such as ruminal pH and microflora, rapid ingestion, consuming large amount of immature cyanogenic plant, amount of cyanogenic glycoside or free HCN in the ingested plants the finding of the result is also reported by (Dereje *et al.*, 2015) <sup>[1]</sup>. Hydrogen cyanide is released in the rumen which combines with methaemoglobin to form cyanmethemoglobin. This complex inactivates cytochrome oxidase enzyme and inhibits the last step of oxidative phosphorylation. Utilisation of oxygen does not occur resulting in cessation of cellular respiration. Death of the animal in cyanide poisoning is due to histotoxic anoxia. The result of this study is also in agreement with the (Bhadoria and Gupta, 1981) <sup>[3]</sup>. The lethal dose of HCN for ruminants is about 2mg/kg of body weight. Plants containing over 200ppm of these glycosides are categorised as toxic (Vaniprasad and Koley, 2006) <sup>[14]</sup>.

## Treatment

Treatment involves intravenous administration of a mixture containing 1 gram sodium nitrate and 3 ml of 20% sodium thiosulfate, given at a dose rate of 4 ml mixture per 45 kilogram body weight. In sheep, goat or calves, the recommended doses of sodium thiosulfate @ 660 mg/ kg can be given in combination with conventional doses of sodium nitrite @ 6.6 mg/ kg. 50 ml distill water, Cattle and Buffaloes: sodium nitrite 3 gm and sodium thiosulfate 15 gm in 200ml in distill water should be administered intravenous. (Vaniprasad and Koley, 2006) <sup>[14]</sup>.

## Conclusion

The Phytopoisoning occurs due to shortage of feed, nutritional deficiency and excessive consumption are the major predisposing factors for the occurrence of plant poisoning. Clinical signs are exhibited within minutes to a few hours. Death in animals usually occurs within 2 hours after consuming the *Acacia leuphloea* plant. Laboured breathing, dyspnoea, restlessness, tremors, terminal clonic convulsions and opisthotonus are the clinical signs shown by the intoxicated animal. Qualitative analysis of rumen content and feed sample by using the picric paper test, Dragendorf reagent and Mayer test. For this rumen contents and forages should be preserved in the frozen condition until analysis. This study showed that caprine and bovine are the most frequently poisoned animals. Hence, phytopoisoning is commonly occurring and challenging health of livestock. The findings of this analysis suggest that picrate paper test and Dragendorf reagent and/or Mayer test could be used as field test for qualitative evaluation of feed sample and alkaloids. Also feed and fodder, pasture of animals should be properly monitored for absence of any fungal growth.

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