

Nitrate Poisoning in Crossbred White Cattle in Namakkal

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Nitrate poisoning in cattle is caused by the consumption of an excessive amount of nitrate or nitrite from grazing crops, hay, silage, weeds, drinking water and fertilizer. Signs of poisoning include diarrhea, salivation and abdominal pain. Accumulation of nitrites in the gastrointestinal tract leads to their absorption into blood stream which convert haemoglobin to methamoglobin is the cause of animal death. An attempt has been made to study the cause of mortality of 23 crossbred white cattles died in the Vaiyappamalai area of Namakkal district in the year of 2011 and 2012.

Materials and Methods

Affected animals were examined for the presence of abnormal clinical signs. Blood samples were collected from the animals for haematology and analysed in the Clinical Pathology Laboratory by using haematology analyser (Vet Scan HM2, Abaxis, USA). Differential leucocytes were determined manually from the Leishman stained blood smear. Water and feed samples collected from different locations were submitted to Animal Feed Analytical and Quality Assurance Laboratory (AFAQAL), Veterinary College and Research Institute, Namakkal for estimation of nitrate level. Nitrate levels were estimated as per AOAC (1995).

Results and Discussion

Clinical examination of a 5 year-old Jersey crossbred cow revealed abdominal pain, grinding of teeth, lying in the lateral recumbency and passing diarrhoeic stools. The visible mucous membranes appeared cyanotic. The blood was chocolate brown in colour indicating the presence of methamoglobin which is a characteristic change in nitrate poisoning (Jones *et al.*

al., 1997; Robson, 2007; Jubb *et al.* 2007). Blood sample collected from the affected animals did not reveal any alterations in the blood pictures except significantly reduced level of haemoglobin (4.2 gm/dL). Few carcasses brought for post mortem examination revealed congested liver and kidneys. Intestines distended with partially digested ingesta. One carcass showed rupture of intestine and spillage of contents into the abdominal cavity.

Out of 13 water samples analysed for nitrate levels, 5 samples showed more than 500 ppm, 3 samples showed above 1500 ppm and 2 showed greater than 3000 ppm. Water containing any amount of nitrate is undesirable which indicates organic pollution. Water containing 1000 ppm of nitrate usually causes poisoning in animals (Jones *et al. loc.cit*). Water contaminated by fertilizer and animal wastes act as source of nitrate toxicity. Stagnant waters, especially well water, in areas of high fertility of soils tend to accumulate toxic levels of nitrate (Jubb *et al., loc.cit*).

The nitrate levels in the grass and Jowar varied from 930 to 68806 ppm. The nitrate content of the plant is extremely variable and influenced by the availability of the nitrogen in the soil. The application of herbicides may lead to accumulation of nitrates in plants. It causes deficiency of other essential nutrients such as sulphur resulting metabolic disturbances in the plant and accumulation of nitrate (Jubb *et al. loc.cit*). Agricultural fertilizers like urea and ammonium sulphate containing large amounts of nitrate or nitrite are also responsible for the occurrence of nitrate poisoning (Robson, 2007; *loc.cit*)

Weeds, root crops, cereal hays and immature cereal crops have very high level of

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nitrate which grows along with the grasses. Under good growing conditions, plants absorb nitrates from the soil and convert them into plant proteins (Burrows, 1980). Any stress that decreases plant growth can increase nitrate concentration. The most common cause of nitrate accumulation is drought stress. In normal growing conditions, plant nitrate levels are elevated one to two weeks after fertilization. When plants are stressed, dangerous nitrate levels build up in the plants (Nicholls and Miles, 1980). Feed ingredients such as rice, deoiled rice bran and deoiled ground nut oil cake collected and submitted for analysis did not show any level of nitrate.

Summary

Vaiyappamalai is situated in between mountains. Ground water level is constantly low due to inadequate rain throughout the year and it worsens during summer. Poultry manure and fertilizers are used for farming activities. Most of the water and feed samples submitted

for estimation of nitrate level revealed greater than 500 ppm. Marginally toxic levels of nitrate in water, combined with marginally toxic levels of nitrate in feed, was the cause of nitrate poisoning. Affected animals were treated with intravenous injection of methylene blue. Only few animals responded to the treatment.

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Histopathological Studies of Small Intestine on Cattle due to Paratuberculosis in Rajasthan

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The adverse effect of gastro-intestinal pathogens in cattle are of major importance, causes economic losses on a large scale throughout the world.

Certain lesions that affect the intestine comprises some of the most frequently encountered diseases in clinical practice for instance infarcts, haemorrhage etc. In addition, inflammatory disorders like tuberculosis, paratuberculosis and various types of enteritis.

The paratuberculosis occurs worldwide, characteristic lesions are found in the intestine, especially the ileum (Sastry and Rao, 2005).

Materials and Methods

The specimens of cattle small intestine for the proposed investigation were collected from the carcasses of cattle irrespective of sex, age and breeds. The samples were procured from various municipal areas of Bikaner, Jodhpur and Kota districts.

The samples were also collected from the carcasses submitted to the Department of Veterinary Pathology, College of veterinary and Animal Science, Bikaner for routine post-mortem examination.

During post-mortem examination, the