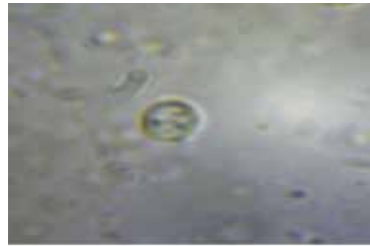
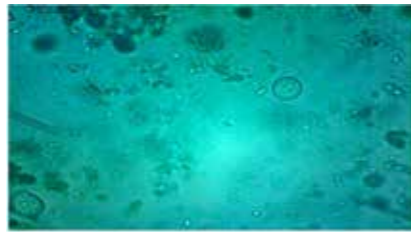


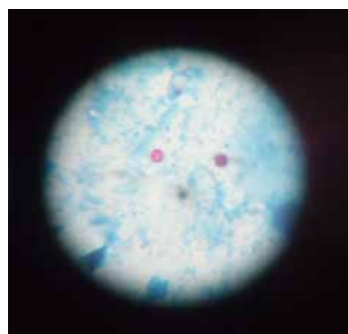
- **Molecular based method:** Genomic DNA can be extracted from Cryptosporidium positive specimens by using DNA stool minikit (QIAGEN). Amplification of 18S SSU rRNA gene of Cryptosporidium sp. can be done by Nested PCR and in positive case 1325 bp and 845 bp bands in the primary and secondary PCR, respectively.



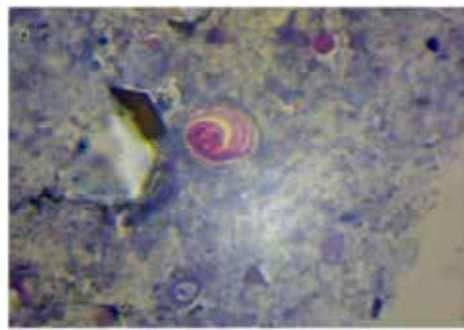
**Oocysts in
Sheather's sucrose
solution**



**Oocysts in Malachite
green stain**



Oocysts in modified Ziehl-Neelsen acid fast stain



Control and treatment

- Many antimicrobial agents have been investigated for treatment or prophylaxis of calves at risk for cryptosporidiosis. Among them are allicin, ionophores (monensin and lasolocid), amprolium, decoquinate, sulfas, paromomycin, nitazoxanide and halofinone.
- Immunodominant Cryptosporidium antigens have been identified and subunit vaccines have been prepared. Using active and passive immunization approaches, vaccines have been shown to reduce clinical signs but not eliminated oocyst shedding.
- Separation of infected calves from healthy calves and maintenance of sanitation and hygiene in the farm premises will reduce spread of infections.

Compiled by:

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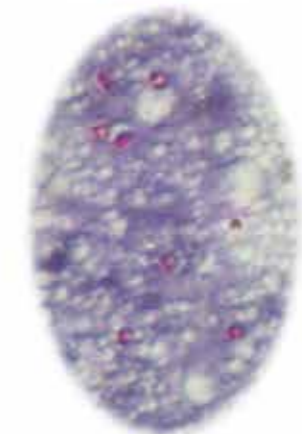
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BOVINE CRYPTOSPORIDIOSIS



**ICAR RESEARCH COMPLEX FOR NEH REGION
UMROI ROAD, UMIAM, MEGHALAYA-793103**

2018

Bovine cryptosporidiosis is a common disease affecting newborn calves and is characterized by acute gastrointestinal disturbances, mucoid or haemorrhagic watery diarrhea, fever, lethargy, anorexia and loss of condition leading to significant economic losses in farm animals and neonatal morbidity in cattle. The intensity of shedding has been found to be significantly higher in calves with diarrhea. With the attainment of immunological maturity, infection subsides in the older cattle. Affected animals upon recovery become carriers and hence act as source of infection to the susceptible individuals. The organism responsible for cryptosporidiosis is an ubiquitous intracellular extra-cytoplasmic apicomplexan protozoan parasites. The common feature in this species is the presence of four naked sporozoites, which are contained within a thick walled oocyst without sporocysts.

Species and infectivity

Four species of *Cryptosporidium* are primarily known to infect cattle viz., *C. parvum*, *C. andersoni*, *C. bovis* and *C. ryanae*. *C. parvum* is the only prevalent zoonotic species in cattle responsible for about 85% of the *Cryptosporidium* infections in pre-weaned calves. *C. parvum* has been incriminated as an important cause of neonatal diarrhoea in calves and calves of 1–3 weeks old are mostly susceptible. But the post-weaned calves are mostly infected with *C. bovis*, *C. andersoni* and *C. ryanae*. The abomasal species i.e. *C. andersoni* mainly infects juvenile, post-weaned and adult cattle. *C. andersoni* has been associated with gastritis, reduced milk yield and poor weight gain in the adult cattle.

Mode of transmission

The sporulated oocyst of *Cryptosporidium* sp. can be transmitted from an infected host to a susceptible host by the fecal-oral route. Other routes of transmission are: person-to-person contact, contact with companion and farm animals and ingestion of contaminated food, drinking water and recreational water with sporulated oocysts.

Clinical signs and symptoms

The main clinical manifestations of infected animal are diarrhoea, depression, anorexia and abdominal pain. Clinical cryptosporidiosis in calves is observed mainly in calves between 7–30 days of age, which lasts for 4–14 days. The diarrhoea is pale yellow in colour with mucus which can be mild to severe and can last for two weeks. Calves are usually lethargic, anorexic and dehydrated. In severe cases, calves die from dehydration and cardiovascular collapse. Calves with severe cryptosporidiosis can take four to six weeks to recover fully, and there could be negative impact on production due to weight loss or impaired weight gain and thereby contributing to economic loss.



Infected calves



Diarrhoeic feces

Pathogenesis

The pathogenesis of diarrhoea may be due to invasion of intestine by the parasites and epithelial cell destruction resulting in mild to moderate villus atrophy. Microvillus shortening and destruction leads to impaired nutrient digestion and transport.

Public health significance

Human cryptosporidiosis may be associated with exposure to infected cattle, particularly young calves, animal manure and contaminated water.

Diagnosis of Cryptosporidiosis in bovines

Sample collection: Fecal samples should be collected per rectum from suspected animals in sterile vials and store immediately in 2.5% potassium dichromate solution and transfer to laboratory under 4°C.

Staining of fecal smears: Oocyst of *Cryptosporidium* spp. is not detected by normal fecal examination techniques. Sheather's sugar flotation technique is used for initial screening of fecal samples. Several special staining methods such as modified Ziehl-Neelsen acid fast, Kinyoun's staining, Safranin methylene blue staining, Malachite green stain (0.2%) etc are used for detection of *Cryptosporidium* oocysts. In Sheather's sucrose flotation, the oocysts appeared as round or oval, refractile bodies with a thin cytoplasmic membrane. However, in modified Ziehl-Neelsen staining, the oocysts appear as spherical to ellipsoidal shaped pink to red stained bodies containing four sporozoites against a pale green background.