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EPIDEMIOLOGICAL DISTRIBUTION OF *ESCHERICHIA COLI* IN DIARRHOEIC CALVES IN ANDHRA PRADESH AND TELANGANA STATES

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Abstract: The aim of the present research is to study the epidemiological distribution of *Escherichia coli* in diarrhoeic calves in Andhra Pradesh and Telangana States with an object to formulate suitable preventive strategies in controlling *E. coli* associated diarrhoea in calves. A total of 129 faecal samples from diarrhoeic calves of 1 to 7, 8-30, 31-60 and 61-90 days age were collected randomly from the selected districts in Andhra Pradesh and Telangana States of which 60 (46.51%) samples were found positive for *E. coli.* Highest prevalence of *E. coli* was also observed in 1-7 day old diarrhoeic (51.52%) calves and the prevalence was decreasing with age. Among the districts, higher prevalence of *E. coli* was observed in West Godavari district (60%), while lowest prevalence was observed in Ranga Reddy district. The present study revealed highest prevalence of *E. coli* associated diarrhoea in one to seven days calves in coastal districts than calves in upland areas.

Keywords: Epidemiological distribution, *E.coli*, diarrhoeic calves.

Introduction

Dairy farming is the major source of income to the farmers in Andhra Pradesh and Telangana States. However, increased calf mortalities due to calf diarrhoea are primarily responsible for economic loss to the diary producrers directly through mortalities and indirectly through morbidity and increased treatment costs. The cause of diarrhoea in calves may be due to bacteria, virus, parasites and other etiological agents while *Escherichia coli (E.coli)* was recognized as the leading cause (Abubaker *et al*., 2015). Several studies reported the involvement of *E. coli* as a cause of diarrhea, haemorrhagic c**o**litis and dysentery in weak, malnourished, debilitated and immunosuppressed calves particularly those calves are not receiving maternal antibodies through colostrum (Ellaithi, 2004; Mohamed, 2009 and Malik *et al*., 2013). *E. coli* is a gram-negative, rod-shaped, flagellated, non-sporulating and

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facultative anaerobic bacterium of the family enterobacteriaceae. *E. coli* strains are classified into six main pathotypes based on their distinct virulence determinants and pathogenic features, including enteropathogenic *E. coli* (EPEC), enterotoxigenic *E. coli* (ETEC), enterohemorragic *E.coli* (EHEC)/Shiga toxin-producing *E. coli* (STEC), enteroinvasive *E. coli* (EIEC), enteroaggregative *E.coli* (EAEC), and diffusively adherent *E. coli* (DAEC) (Xia *et al*., 2010).

Since there is dearth of information on epidemiological distribution of *E. coli* in diarrhoeic calves in Andhra Pradesh and Telangana States, the present research has been carried out with an object to find out the prevalence of *E.coli* associated diarrhoea in calves to formulate suitable preventive strategies in controlling calf diarrhoea in this geographic region.

Materials and Methods

A total of 129 faecal samples from diarrhoeic calves of 1 to 7, 8-30, 31-60 and 61-90 days age were collected randomly from organized dairy farms and individual farmers of East Godavari, West Godavari, Krishna, Guntur, Prakasam, Chittor Districts of Andhra Pradesh State and Ranga Reddy District of Telangana State during the period from May 2014 to November 2015. Geographical distribution and age of diarrhoeic calves were recorded during sampling. The faecal samples were collected using sterile rectal swabs. After collection, the swabs were immediately transported to the department of Veterinary Microbiology, NTR College of Veterinary Science, Gannavaram in ice-cooled containers for *E. coli* isolation. All the samples were inoculated on Macconkey agar and incubated at 37^0c for 24 hours. The pink colonies obtained were again inoculated on EMB agar and the colonies showing green metallic sheen were selected and confirmed as *E.coli* by standard biochemical tests (Cruickshank, 1970) and by polymerase chain reaction amplifying 16S rRNA gene (Sundong-bo et al., 2011)

Isolation of DNA from *E.coli* was carried out by conventional boiling and snap chilling method with slight modifications. A single colony was inoculated in 1ml Tryptic soy broth and incubated at 37^0c for 24 hrs. The cells were harvested by centrifugation at 5000rpm for 10minutes. The pellet was washed with phosphate buffer saline by centrifuging at 500rpm for 10 minutes for twice. Then the pellet was resuspended in 500 µl nuclease free water and boiled for 5-10 min at 100^0c and snap chilled on ice, after centrifugation at 1000rpm for 5 minutes, supernatant was used as template DNA.

Results and Discussion

Out of 129 faecal samples collected from diarrhoeic calves, 60 (46.51%) samples were found positive for *E. coli* after biochemical and molecular charecterization (Table 1). Compared with present study, higher prevalence in diarrhoeic cow calves was observed by Begum *et al*. (2014) in Assam (88.57), Pourtaghi *et al*. (2013) in Iran (86.7%), Haggag and Khaliel (2002) in Egypt (82%) and Islam *et al.* (2015) in Bangladesh (57%). On the other hand lower prevalence of *E.coli* was reported in diarrhoeic cow calves by Oporto *et al*. (2008) in Northern Spain (35.9%), Luna *et al.* (2009) in Austria (18.9%) and Izzo *et al*. (2011) in Australia (17.4%) and in healthy cow calves by Luna *et al*. (2009) in Austria (15.7%)

Among different age groups, higher prevalence of *E. coli* was also observed in 1-7 day old diarrhoeic (51.52%) calves than 8-30, 61-90 and 31-60 days cow calves. Similar results were reported by Islam *et al*. (2015), who observed highest prevalence (66.7%) of *E.coli* in diarrhoeic calves of up to 6 days age compared to the calves of above 6 days to 2 months. Davoodi and Nourmohammadzade (2013) also reported highest prevalence of *E.coli* (68.81%) in faecal samples of diarrhoeic calves of 1 week age, while lower prevalence (31.37%) was observed in older calves (4 weeks age). In calves, highest risk of diarrhea was observed within the first month of life and the incidence of diarrhoea was decreased with age (Garcia *et al.,* 2000).

The higher prevalence of *E. coli* in younger calves may be due to poor managemental practices and predisposing factors like overcrowding and malnutrition, which are supposed to be a primary cause of immunosuppression (Abdulgayeid *et al.*, 2015). Further, *E. coli* is a commensal organism and is responsible for diarrhoea in calves, particularly calves receiving less or no maternal antibodies through colostrum where milk is mainly used for commercial purposes (Malik *et al*., 2013).

Highest prevalence (60%) of *E.coli* associated diarrhoea was observed in West Godavari district while lowest prevalence (36.6%) was observed in Ranga Reddy district. Higher population density of calves, hot and humid coastal environment and allowing the calves for suckling at the end of milking resulting intake of high fat milk in West Godavari district might responsible for increased susceptibility of calves to *E.coli* infection. The differences of the prevalence rates of *E. coli* in diarrhoeic calves may be attributed to the geographical locations and management practices as well as hygienic measures which influence the susceptibility of calves to *E. coli* infection (Cho and Yoon, 2014 and Içen *et al.*, 2013). Since

E.coli is a facultative habitant of the gastrointestinal tract, any factor that predisposes for altering resistance will increase the incidence of *E.coli* associated diarrhoea in calves.

Table: 1 Epidemiological distribution of *E.coli* in diarrhoeic calves of different age groups in Andhra Pradesh and Telangana States

District	Faecal samples collected					*E.coli* isolated (%)									
	Age of the calf (Days)														
	1-7	**8-30**	**31-60**	**61-90**	**Total**	**1-7**	**%**	**8-30**	**%**	**31-60**	**%**	**61-90**	**%**	**Total**	**%**
East Godavari	5	6	4	2	17	4	80	2	33.33	1	25.00	1	50.00	8	47.10
West Godavari	5	8	5	2	20	3	60	5	62.50	3	60.00	1	50.00	12	60.00
Krishna	6	13	6	3	28	3	50	6	46.15	3	50.00	-	-	12	42.85
Chittor	11	23	6	2	42	5	45.45	11	47.83	3	50.00	1	50.00	20	47.62
Ranga Reddy	6	10	4	2	22	2	33.33	4	40.00	1	25.00	1	50.00	8	36.36
	33	**60**	**25**	**11**	**129**	**17**	**51.52**	**28**	**46.67**	**11**	**44.00**	**4**	**36.36**	**60**	**46.51**

The present study concluded that the prevalence of *E. coli* associated diarrhoea was highest in young calves of one to seven day old. Further, highest isolation of *E. coli* was detected in coastal districts compared to upland areas.

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