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EFFICACY OF POLYHERBAL FORMULATION IN THE TREATMENT OF DIARRHOEA IN BROILER BIRDS

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ABSTRACT

A total of 120 broiler birds were procured for the experiment and allocated into four groups with 30 birds in each. Group T0 was kept as negative control. Group T1 was kept as positive control challenged with *E.coli* on 8th day and kept on non-medicated feed. Group T2 was treated with Salcochek pro at the rate of 500g/tonne of feed (Prophylactic dose) with concurrent challenge with *E.coli* on 8th day. Group T3 was treated with Salcochek Pro at the rate of 1000g/tonne of feed (therapeutic dose) with concurrent challenge with *E.coli* on 8th day. Parameters viz. performance traits, clinical symptoms, mortality, TVC of *E.coli* in faecal samples, haemagglutination inhibition titre were evaluated. Results revealed that the mean weekly body weight and mean weight gain were significantly improved in the Salcochek Pro (M/S Ayurvet) treated groups T2 and T3 in comparison to the positive control group T0. Mortality % was significantly reduced in the Salcochek Pro treated groups as compared to the control group. Total viable *E.coli* count in faeces was also significantly less in the Salcochek Pro treated groups as compared to control. The haemagglutination inhibition titre was significantly higher in the Salcochek Pro treated groups as compared to the control. Thus it can be concluded that Salcochek Pro possesses significant ant-diarrhoeal property and is highly efficacious in the treatment of diarrhoea.

KEYWORDS : Body weight, Hemagglutination Inhibition Titre, TVC, Diarrhoea.

INTRODUCTION

Poultry production is the fastest growing component of global meat production, with developing and transitional countries assuming a leading role (**Assa, 2012**). Worldwide, the poultry industry spends a significant amount of money in the prevention and treatment of several diseases (**Castaneda and Gonzalvez, 2015**). Bacterial infections remain important to the poultry industry both in terms of animal and public health, the latter due to the importance of poultry as a source of foodborne bacterial zoonoses (**Wigley, 2013**). Avian colibacillosis is an infectious disease of birds caused by *Escherichia coli*, which is considered as one of the principal causes of morbidity and mortality, associated with heavy economic losses to the poultry industry by its association with various disease conditions, either as primary pathogen or as a secondary pathogen (**Kabir, 2010**). Many antibiotics are used routinely for bacterial disease prevention in poultry or for the treatment of outbreaks of disease (**Edens, 2003**). However, antibiotic usage in general and relevance of non-therapeutic antibiotics (growth promoters) in feed need to be reevaluated especially because bacterial pathogens of humans and animals have developed and shared a variety of antibiotic resistance mechanisms that can easily be spread within microbial communities. (**Diarra and Malouin, 2014**). A number of alternatives/replacements to the rampant antibiotic usage have been proposed which can eventually lead to gradual phasing out of antibiotics from the scheme of poultry disease treatment in the future (Seal et al., 2013). Many herbal plants possess anti bacterial properties and are promising candidates as herbal alternative to the rampant use of antibiotics (**Romero *et al.,* 2005**; **Yasurin, 2015).** Thus, the present study has been undertaken to evaluate the efficacy of herbal anti-diarrhoeal in the treatment of *E.coli* induced diarrhoea in poultry.

MATERIALS AND METHODS

Experimental design

The present study was carried out in the Department of Microbiology, KNP college of Veterinary science, Shirwal during the period of 2016-17 to evaluate the prophylactic and therapeutic efficacy of herbal anti-diarrhoeal Salcochek Pro (M/S Ayurvet Limited) in broilers. A total of 120 healthy vaccinated commercial broiler chicks weighing between 45-55 g were procured from Ms/- Venkateswara hatchery. The broilers were divided into four groups having 30 birds in each. Group T0 (n=30) was kept as negative control and fed standard basal diet. Group T1 (n=30) was kept as positive control and challenged with 0.4ml *E.coli* inoculum (approx. bacterial count 1 x 10^4 CFU/ml) on 8th day of age and was kept on a non-medicated diet. Group T2 was supplemented with Salcochek pro at a prophylactic dose of 500g/tonne of feed from 0 day to 35th day along with concurrent challenge with 0.4 ml E.coli inoculum (approx bacterial count 1 x 10^4 CFU/ml) on 8th day. Group T3 was supplemented with Salcochek pro at a therapeutic dose of 1000g/tonne of feed from 0 day to 35th day along with concurrent challenge with 0.4ml E.coli inoculums (approx. bacterial count 1 x 104 CFU/ml) on 8th day. Performance parameters viz. weekly body weight, body weight gain were recorded. Microbiological studies viz. total viable E.coli count, Haemagglutinin inhibition titre were also carried out.

Statistical analysis

All the results were analyzed statistically by analysis of variance to determine the means and standard error as per the the methods described by **Snedecor and Cochran, 1994**.

RESULTS AND DISCUSSION

Weekly body weight

The mean weekly body weight was found to be significantly higher in the Salcochek Pro (therapeutic dose) treated group T3 (1903 g) and Salcochek Pro (prophylactic dose) treated group T2 (1816 g) as compared to the positive control group T1 (1311 g) at the end of 5th week. This may be attributed to the presence of *Plantago ovata* in Salcochek Pro, which is a dietary fibre and helps build up important microflora by acting as a substrate food for beneficial organisms and improves host health (**Chawla and Patil, 2010**). The anti-diarrhoeal effect conferred by *Aegle marmelos* (**Jali *et al.,* 2014**), a constituent ingredient of Salcochek pro, may have played a significant role in increased weight body weight by negating the deleterious consequences of diarrhoea (**Raji, 2014**).

Table 1. Weekly body weight (g) of broilers in the control and treated groups

Age of birds	Group T0	Group T1	Group T2	Group T3
1st Week	184±0.68	177±0.076	179±0.176	170.±0.157

2nd Week	458±0.065	299±0.16	446±0.156	436±0.155
3rd Week	896±0.136	521±0.19	833±0.17	837±0.128
4th Week	1412±0.114	867±0.18	1290±0.149	1327±0.144
5th Week	2002±0.159	1311±0.16	1816±0.124	1903±0.11

Weekly body weight gain

The weekly body weight gain was found to be significantly higher in the Salcochek Pro treated groups T3 (86g) and T2 (83g) as compared to the positive control T1 (68g). The increase in body weight gain may be due to the concerted effect of herbs viz. *Aegle marmelos, Acacia catechu* which have been known to possess astringent (**Hashmat and Hussain 2013**; **Maity et al.,2009**), antibacterial (**Negi and Dave, 2011**; **Meena et al., 2016**) and gut modulating functions (**Yadav et al., 2015**; **Rajvaidhya et al., 2012**).

Table 2. Weekly body weight gain (g) of broilers in control and treated groups

Age of birds	Group T0	Group T1	Group T2	Group T3
1st Week	27±0.11	28±0.04	27±0.08	27±0.10
2nd Week	50±0.20	18±0.03	48±0.12	44±0.15
3rd Week	67±0.12	39±0.04	60±0.11	62±0.10
4th Week	78±0.12	58±0.02	68±0.18	75±0.13
5th Week	88±0.10	68±0.09	83±0.13	86±0.11

Mortality

The mortality % was significantly less in the Salcochek Pro treated groups T3 (0.56 %) and T2 (0.56 %) as compared to the positive control group T1 (3.89 %). The reduced mortality may be ascribed to an improved and stronger immune response acquired from exposure to a confluence of herbs viz. *Acacia catechu , Plantago ovate, Aegle marmelos,* (**Rezaeipoor et al., 2000**; **Pratheepa et al., 2010**; **Singh et al., 2016**) which is instrumental in warding off the deleterious effects of bacterial overgrowth.

Table 3. Mortality % of broilers in the control and treated groups

Groups	T0	T1	T2	T3
Mortality %	0.56	3.89	0.56	0.56

Total viable *E.coli* count (mean log_{10}cfu/ml)

The mean cfu on completion of trial after 28th day of trial in the Salcochek Pro treated groups T3 (146 x 10^3) and T2 (169 x 10^3) was significantly reduced as compared to the positive control group T1 (251 x 106) Log10cfu/ml on completion of trial in the Salcochek Pro treated groups T3 (-1.835) and T2 (-1.77) was significantly less as compared to positive control (infected) group T1 (1.394). Studies have shown that *Aegle marmelos* is effective against *E.coli* infection (**Sudharameshwari and Radhika, 2006**). *Aegle marmelos* is a constituent ingredient of Salcochek Pro and is thus effective in reducing total viable *E.coli* count.

Table 4. Results of total viable *E.coli* count (mean log 10 cfu/ml) in the control and Salcochek treated groups

On 3rd day after challenge				
	T0	T1	T2	T3
Mean cfu	238 x 10^3	247 x 10^5	222 x 10^5	151 x 10^6
Log_{10}cfu/ml	-1.62	1.382	0.336	1.16
On completion of trial after 28th day				
Mean cfu	256 x 10^3	251 x 10^6	169 x 10^3	146 x 10^3
Log10cfu/ml	-1.589	1.394	-1.77	-1.835

Haemagglutination inhibition titre

The mean titre on 28th day was significantly higher in the Salcochek Pro treated groups T3 (1:83.2) and T2 (1:44.8) as compared to the positive control group T1 (1:12). The mean log2/ml on 28th day in the Salcochek treated groups T3 (6.3±0.153) and T2 (5.4±0.165) was significantly higher as compared to the positive control (infected) group T1 (3.5±0.17). The increase in the mean titre may be attributed to the presence of herbs viz. *Aegle marmelos*, *Acacia catechu* in Salcochek Pro which have been known to possess immuno modulatory effect (**Govinda and Asdaq 2011**; **Ismail and Asad, 2009**).

Table 5. Results of Heamagglutination inhibition titre (mean log2 antibodies/ml) of control and treated groups

Before Vaccination				
Groups	Group T0	Group T1	Group T2	Group T3
Mean titre	1:14.4	1:12	1:12	1:12.8
Mean log2/ml	3.8±0.133	3.5±0.167	3.5±0.167	3.6±0.165
After vaccination on 28th day				
Mean titre	1:48	1:12	1:44.8	1:83.2
Mean log2/ml	5.5±0.164	3.5±0.17	5.4±0.165	6.3±0.153

CONCLUSION

The body weight was significantly higher in the Salcochek treated groups as compared to positive control. The total *E.coli* count was significantly less in the faecal samples of Salcochek Pro treated groups as compared to positive control. The results indicate a significant anti-diarrhoeal effect of Salcochek Pro on *E.coli* induced diarrhoea.

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