

## A new Polyherbal formulation to control bacterial enteritis in poultry: a case study in *Salmonella enteritidis* induced experimental model

K.K.Baishya <sup>1</sup>, Shivi Maini <sup>2</sup> and K.Ravikanth <sup>2</sup>

1) Veterinary Officer, Kashipur, Uttaranchal, India.

2) Scientist, Ayurved Limited, Vill. Katha, P.O.Baddi, Dist. Solan (H.P.), India.

### Abstract

An experimental study was conducted in day old 150 VenCobb chicks to evaluate efficacy of polyherbal formulation in induced bacterial enteritis with *Salmonella enteritidis*. Birds were randomly divided into three groups: negative control, infected and untreated control & prophylactically treated group with AV/ADC/16 (14<sup>th</sup>-28<sup>th</sup> days). *Salmonella* infection was induced on day 21<sup>st</sup>. A significant decrease in overall growth, productivity, feed conversion and mortality was evident in untreated infected group in addition to severity of clinical signs. However, prophylactic administration of herbal formulation reduced mortality and clinical symptoms were mild to negligible. No negative effect on growth & performance was observed in treated group III.

**Keywords:** Enteritis, Polyherbal, Antidiarrhoeal, Performance

### Introduction

Colibacillosis, necrotic & hemorrhagic enteritis are some of the infectious diseases affecting digestive system in poultry. Problems may range from severe acute infections with sudden death or high mortality to mild infections of a chronic nature with low morbidity and mortality. Specific & non-specific enteritis is one of the most economically important since it has been shown to impair feed conversion in broilers (Stutz and Lawton, 1984). Antibacterial feed additives such as bacitracin, virginiamycin, penicillin etc. (Ficken and Wages, 1997; George et al., 1982; Maxey and Page, 1977; Stutz and Lawton, 1984, Watkins et al., 1997) and the ionophore anticoccidial agents (Prescott and Baggot, 1993) were the most obvious choice of practitioners to treat infectious enteritis before their restricted usage by European Union (EU) in 1999. But after this prohibition by EU, many countries have experienced necrotic enteritis in near epidemic proportions (25-40%) in broiler flocks (Kaldhusdal and Lovland, 2000). There are alarming concerns by consumers and also government health officials regarding the use of these antibiotics in food producing animals due to the potential transfer of antibiotic resistance to human bacterial pathogens. The consequence of these actions is limiting or eliminating use of antibiotic growth promotants in many broiler-producing areas of the world. Therefore, new methods for prevention of necrotic enteritis must be investigated.

Current study is designed to evaluate efficacy of polyherbal formulation in induced bacterial enteritis in broilers.

### Materials and Methods

A five weeks experimental study was conducted in a poultry farm at Kashipur, Dist, U.S.Nagar, Uttaranchal, to evaluate prophylactic efficacy of polyherbal antidiarrhoeal formulation AV/ADC/16 (research code name of a new herbal formulation developed and supplied by M/S Ayurved Ltd.) in *Salmonella enteritidis* induced enteritis in broilers. Total numbers of one hundred fifty unsexed day old VenCobb chicks of nearly similar live body weight were divided into three groups randomly (n=50) and kept under similar environmental & managemental conditions upto 14 days age for acclimatization. Group I was non-infected, non-medicated, negative control. Group II, positive control (infected and non-medicated). Group III (infected and medicated) was prophylactically treated with polyherbal formulation AV/ADC/16 @ 2 kg/tonne of feed, supplemented alongwith commercially purchased standard basal starter & grower diet (meeting NRC requirements for poultry), from 14 days up to 28 days age. Infection in Group II & III was induced with 10<sup>6</sup> CFU of *Salmonella enteritidis* virulent strain by intra-cloacal route at the age of 21 days. Observations of clinical symptoms, growth & performance parameters & recovery from bacterial diarrhoea were recorded till the end of

experimental study. The data on growth, performance & haematology was subjected to statistical analysis (Snedecor and Cochran, 1980).

### Results and Discussion

The clinical signs of enteritis viz loose faeces, foul odour, ruffled feathers, hemorrhagic enteritis, loss of appetite, reduced feed intake, dullness & depression started appearing in group II & III, within 24 hour post-inoculation of infection. The clinical signs were persistent in untreated group II. Recovery in treated group III was observed within 3-4 days post infection. The cumulative body weight & feed efficiency was low & mortality percentage was higher in infected non-medicated group II at the end of 5 weeks. Average feed intake was 2620gm, 2205 gm and 2600 gm and feed efficiency (FCR) was 1.78, 2.4 and 1.93 for group I, II and III respectively, indicating that feed intake was reduced in infected non-medicated birds (group II) while prophylaxis with polyherbal formulation AV/ADC/16 improved feed efficiency and average feed intake. At 5 weeks of age, mean body weight of prophylactically treated birds was significantly higher ( $1350 \pm 1.78$ gm) than the infected birds ( $1000 \pm 2.04$ gm) while that of non-infected, non-medicated group was  $1470 \pm 1.51$ gm. Heavy mortality upto 32% was observed in infected untreated group, however it was 4% and 10% in group I and III respectively. Histopathological studies revealed septicemic and necrotic changes in liver, kidney spleen and heart of infected non-medicated birds while no such severe changes were observed in the treated group. From the present experimental study, it can be concluded that pharmaco-active constituent herbs of AV/ADC/16 alleviated diarrhoeac symptoms by adsorption and inactivation of enterotoxins and protecting gastro-intestinal mucosa without any adverse effects and improves overall performance of birds in terms of growth rate and feed efficiency. (Gupta et al., 1992; Jolly et al., 1996; Sack et al., 1982) also reported

antidiarrhoeal, gastroprotective and immuno-stimulating activities of major constituent herbs viz. *Holarrhena antidysenterica*, *Aegle marmelo*, *Berberis aristata*, *Acacia catechu* etc. of polyherbal formulation AV/ADC/16. The new polyherbal antidiarrhoeal formulation can be recommended as a prophylaxis for treatment of bacterial enteritis in poultry.

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