

Title *Effect of Dietary Supplementation of Catharanthus Roseus on Gross and Micro-Structures of Selected Internal Organs of Broilers*

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Abstract:

Low dose antibiotic growth promoters (AGPs) have been used in poultry feed as a prophylactic for improving performance. Sub-therapeutic use of poultry antibiotics has been banned due to potential development of antibiotic resistance. *Catharanthus roseus* has been reported to contain the antimicrobial, antiviral, antifungal, antioxidant and immunomodulatory properties.

The study was aimed to see the effect of supplementation of *C. roseus* in different concentrations (0%, 0.05%, 0.1% and 0.2%) as an alternative to AGPs on gross and micro-architecture of major internal organs of broilers like GIT, pancreas, liver, kidney, bursa of Fabricius and trachea.

Day-old broilers (n = 112) were randomly divided into four groups (A, B, C & D), each group having 4 replicates and each replicate received 7 chicks. Group A was fed antibiotics free starter feed while group B, C & D were fed same diet with 0.05%, 0.1 % and 0.2% leaf extract of *C. roseus* respectively. Birds were vaccinated with New Castles disease antigen and infectious bursal disease virus. On day 42, 8 chicks per treatment were conventionally slaughtered and required organs like small and large intestine, cecal tonsils, bursa of Fabricius, pancreas, kidney, liver and trachea were collected. Small and large intestines relative lengths were measured.

Samples were processed by paraffin embedding technique and staining was done by Haematoxyline & Eosin technique (for all samples) or combined Alcian blue- PAS (for Tracheal & intestinal samples). Histomorphometry was done by using software (ProgRes® CapturePro - Jenoptik AG). Difference between groups was considered significant at $P < 0.05$. In intestinal parameters, villus height, width, surface area, crypt depth, thickness of lamina propria, muscularis mucosa and muscularis externa were measured. Acidic and mixed mucin containing goblet cells and intraepithelial lymphocytes were also counted in intestinal samples.

In bursa of Fabricius, length, width and area of lymphatic follicles were measured. Length, width and area of lymphatic nodules were measured in cecal tonsil. Length, width and area of islets of Langerhans were measured in pancreas. In kidney, diameter of proximal convoluted tubules, distal convoluted tubules and glomerulus was measured. Diameter of sinusoids and centro lobular vein was measured in liver. Differentiation of acidic, mixed and neutral goblet cells and ratio between total goblet cells and epithelial cells were counted in trachea.

0.1 % CR significantly increased the villus surface area as compared to 0.05% (duodenum), 0% (jejunum) & both 0% & 0.05% (ileum) respectively. Thickness of muscularis mucosa of duodenum and muscularis externa of jejunum was significantly decreased with 0.2% CR as compared to other treatment groups. Muscularis mucosa thickness of ileum was significantly decreased in all supplemented groups as compared to control. Count of acidic mucin in duodenum increased with 0.05% & 0.1% CR supplementation as compared to control. In jejunum acidic mucin count increased in all supplemented groups as compared to control. Mixed mucin count increased in duodenum with 0.1 % CR & 0.2% CR as compared to 0.05% & control groups. Area of lymphatic follicle in Bursa of Fabricius, a lymphatic nodule in cecal tonsils, and islets of Langerhans was greater in 0.05%, 0.2%, and 0.1 %, CR groups respectively as compared to the control group.