

7th Proceedings of the Seminar on Veterinary Sciences, 27 February – 02 March 2012

PATHOGENICITY OF AVIAN PATHOGENIC *ESCHERICHIA COLI* ISOLATES OF MALAYSIA IN SPECIFIC PATHOGEN FREE CHICKENS

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Abstract

Avian pathogenic *Escherichia coli* (APEC) infections of poultry have been regarded to be a major infectious disease in birds and are economically important to poultry production worldwide. The infection is still widely believed to be opportunists or secondary to predisposing conditions. Current studies suggest that APEC is also potentially zoonotic. Existence of APEC in Malaysia is evident but its pathogenicity in poultry is still unknown. The objective of this study was to determine the pathogenicity of APEC of Malaysian isolates in specific pathogen free (SPF) chickens. Fifty-four, day-old SPF chicks were divided into three groups; A, B and C. Each group was further categorized into sacrificed and mortality subgroups. The chicks in sacrificed subgroup were used for sampling and those in the mortality subgroups were only observed for mortality with minimal handling. All chicks were fed an antibiotic-free diet and fresh water *ad libitum* throughout the study. Chicks in groups A and B were inoculated with 0.1 mL of 1×10^8 CFU APEC isolate A (UPM 1101) and APEC isolate B (UPM 1102), respectively whereby 0.05 mL 1×10^8 CFU each was given orally and intranasally. All chicks in group C were left uninoculated and served as controls. Three chicks were sacrificed prior to APEC inoculation. On days 1, 4, 7 and 14 post-inoculation (pi), three chicks each from the sacrificed subgroups of groups A, B and C were sacrificed. Body weights of the sacrificed chicks were recorded and cloacal swab, blood, and liver samples were taken for bacterial isolation and identification. The liver and trachea samples were also taken for histopathological examination. All chicks were observed for clinical signs and mortality throughout the trial. At necropsy, gross lesions were also examined. One dead chick (20%) was observed in mortality subgroup of group B. No mortality was recorded in mortality groups of groups A and C. Chicks in group A developed mild diarrhoea with faecal stains around cloacal area on day 4 pi, uneven body size distribution and ruffled feathers on day 14 pi. Chicks in group B showed moderate diarrhoea with faecal stains around cloacal area on day 4 pi, watery dark brownish diarrhoea, uneven body size distribution and ruffled feathers on day 14 pi. Chicks in group C remained healthy throughout the trial. There was no significant ($p > 0.05$) difference in mean body weight between the three groups. At necropsy, unabsorbed yolk was observed in all sacrificed chicks from groups A, B and C on day 1 pi. Unabsorbed yolk continued to be seen in chicks from group B on day 4 pi. Focal liver necrosis was observed in chicks from group A on day 7 pi. Histopathology revealed presence of lymphocytes and heterophils in submucosa of trachea of chicks from group B as early as day 1 pi and with mild deciliation on days 4, 7 and 14 pi. Lymphocytes and heterophils in submucosa of trachea were recorded in chicks from group C starting from day 4 pi. In group A, the presence of

lymphocytes and heterophils in submucosa of trachea with mild deciliation was observed on days 4, 7 and 14 pi. Area of degeneration and necrosis of liver were also observed on day 7 pi. It was concluded that the A (UPM 1101) and B (UPM 1102) APEC isolates of Malaysia are mildly and moderately pathogenic, respectively in SPF chicks.

Keywords: avian pathogenic *Escherichia coli* (APEC), specific pathogen free chickens (SPF), pathogenicity