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EFFICACY OF INACTIVATED PASTEURELLA MULTOCIDA AGAINST THE BACTERIAL INFECTIONS IN BROILER CHICKENS

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EFFICACY OF INACTIVATED *PASTEURELLA MULTOCIDA* AGAINST THE BACTERIAL INFECTIONS IN BROILER CHICKENS

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It is hereby certified that I have read this project paper entitled "Efficacy of Inactivated *Pasteurella multocida* Against the Bacterial Infections in Broiler Chickens" by Koh Sien Ling and my opinion it is satisfactory in terms of scope, quality and presentation as partially fulfillment of the requirement for the course VPD 4999-Project

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KEBERKESANAN *PASTEURELLA MULTOCIDA* TIDAK AKTIF TERHADAP JANGKITAN BAKTERIA DALAM AYAM PEDAGING

Oleh

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Penyelia: Prof. Dr. Mohd Hair Bejo

Pasteurella multocida adalah ejen penyebab penyakit kolera ayam. Ia menyebabkan kerugian ekonomi kepada industri poultri yang dikaitkan dengan morbiditi dan kematian yang tinggi. Objektif kajian ini adalah untuk menentukan keberkesanan *P. multocida* tidak aktif sama ada sebagai tunggal atau kombinasi serogroup A dan D daripada jangkitan bakteria dalam ayam pedaging. Lapan puluh empat ekor anak ayam telah dibahagi sama kepada tujuh kumpulan. Pada umur satu hari, setiap ayam dalam kumpulan 1 dan 4 telah disuntik dengan *P. multocida* tidak aktif serogroup A, kumpulan 2 dan 5 dengan serogroup D dan kumpulan 3 dan 6 dengan gabungan serogroup A dan D. Semua ayam telah disuntik bawah kulit

dengan 0.1mL *P. multocida* tidak aktif berkepekatan $1X10^{11}$ cfu/mL, kecuali kumpulan 7 sebagai kawalan. Pada umur 14 hari, boster telah diberikan kepada kumpulan 4, 5 dan 6. Pada umur 28 hari, semua ayam telah dibahagikan kepada tiga kumpulan iaitu tiada cabaran dan cabaran samaada laluan intramuskular atau intranasal. Ayam dicabar dengan *P. multocida* serogroup A berkepekatan $1X10^{8}$ cfu/mL. Kajian menunjukkan seekor ayam dari kumpulan 1 dan 7 masing-masing didapati mati pada hari 1 dan 2 selepas cabaran. Pada hari 8 selepas cabaran, semua ayam telah dikorbankan. *P. multocida* diasingkan dari ayam kumpulan 1 dan 7 yang mati. *P. multocida* tidak diasingkan dari semua ayam lain yang dikorbankan pada hari 8 selepas cabaran. Penemuan mata kasar bagi ayam yang mati menunjukkan kongesi yang teruk dalam hati dan buah pinggang. Manakala, tiada penemuan mata kasar bagi ayam yang dikorbankan. Histopatologi untuk ayam yang mati menunjukkan kongesi, nekrosis dan degenerasi yang teruk pada sel hati. Pneumonia, kongesi dan nekrosis yang teruk pada sel peparu juga direkodkan. Sebaliknya, hepatitis yang ringan dengan nekrosis dan degenerasi yang ringan pada sel hati, dan pneumonia yang ringan dengan degenerasi dan nekrosis ringan di sel peparu direkodkan dalam semua kumpulan ayam yang dikorbankan. Kesimpulannya, gabungan *P. multocida* tidak aktif serogroup A dan D boleh memberi perlindungan yang lebih baik terhadap jangkitan *P. multocida* serogroup A berbanding serogroup tunggal A atau D dalam ayam pedaging.

Kata kunci: Keberkesanan, *P. multocida* tidak beraktif , ayam pedaging , *P. multocida* serogroup A dan D

ABSTRACT

An abstract from the project submitted to the Faculty of Veterinary Medicine in partial fulfillment of the requirement for the course VPD4999-Project

EFFICACY OF INACTIVATED *PASTEURELLA MULTOCIDA* AGAINST THE BACTERIAL INFECTIONS IN BROILER CHICKENS

By

Koh Sien Ling

2016

Supervisor: Prof. Dr. Mohd Hair Bejo

Pasteurella multocida is the causative agent of fowl cholera in chickens. It causes economic losses to the poultry industry associated with high morbidity and mortality. The objective of this study was to determine the efficacy of inactivated *P. multocida* either as single or combination of serogroup A and D against the bacterial infection in broiler chickens. Eighty-four, day-old boiler chicken were separated equally into seven groups. On Day 1, chickens from groups 1 and 4 were inoculated with serogroup A, groups 2 and 5 with serogroup D while groups 3 and 6 with combination serogroup A and D. All the chickens were inoculated subcutaneously

with 0.1mL of $1X10^{11}$ cfu/mL of inactivated *P. multocida*, except group 7 as control group. On Day 14, booster was given to groups 4, 5 and 6. On Day 28, all the chickens were divided into three groups namely non-challenge and challenge either via intramuscular or intranasal route. The study showed that one chicken each from group 1 and 7 dead at day 1 and 2 post challenge, respectively. At day 8 post challenge, all the chickens were scarified. *P. multocida* was isolated from the dead chicken in group 1 and 7. *P. multocida* was not isolated from all the other chickens scarified at day 8 post challenge. Gross lesions for the dead chickens reveled generalized congestion in the liver and kidneys while no significant gross lesion seen in sacrificed chickens. Histopathology findings for the dead chickens reveled severe congestion with severe necrosis and degeneration of hepatocytes. Severe pneumonia and severe congestion and necrosis of lung parenchyma were also recorded. In contrast, mild hepatitis with mild necrosis and degeneration of hepatocytes and mild pneumonia with mild congestion, degeneration and necrosis at the lung parenchyma were recorded in all the scarified chickens in all group. In conclusion, inactivated *P. multocida* combination of serogroup A and D could provide better protection against *P. multocida* serogroup A infection when compared to the single serogroup A or D.

Keyword: Efficacy, inactivated P. *multocida*, broiler chickens, *P. multocida* serogroup A and D

1.0 Introduction

Fowl cholera or known as Avian Pasteurellosis is a contagious bacterial disease of domesticated and wild avian species that caused by *Pasteurella multocida* and is often fatal. Among the bacterial diseases of broiler chickens, fowl cholera accounts for major economic losses to the industry worldwide through death, weight loss and condemnations. It usually appears as septicemic disease associated with high morbidity and mortality, but chronic and benign conditions often occurs (Glisson and Cheng, 1991). It typically occurs as fulminating disease with massive bacteraemia in chickens older than 16 weeks of age. The affected chickens showed clinical signs of fever, anorexia, depression, mucus discharge from mouth, diarrhea, ruffled feathers, drop in egg production, coupled with smaller eggs, increased respiratory rate and cyanosis at the time of death. For control and prevention of this disease, farms need to practice good biosecurity and effective vaccination programme. However, farmers' favourite ways to combat fowl cholera is by using various antibiotics such as sulphonamides, tetracyclines, erythromycin, streptomycin and penicilin which are given as prophylaxis or treatment to the birds (Carter, 1967). Excessive usage of antimicrobial drugs in food producing animals have gain more attention by the public due to issues such as antibiotic resistance and residues which will bring harm to human health. Therefore, fowl cholera should be controlled by using vaccine instead of antimicrobial drugs.

The hypothesis of this study was inactivated *P. multocida* combination of serogroup A and D could provide better protection against *P. multocida* serogroup A infection in chickens when compared to the single serogroup A or D. In addition, booster of inactivated *P. multocida* combination of serogroup A and D could provide better protection against *P. multocida* serogroup A infection when compared to non-booster chickens.

The objective of this study was to determine the efficacy of inactivated *P. multocida* either as single or combination of serogroup A and D against the bacterial infection in broiler chickens.

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