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The Influence of Different Challenge Doses of Highly Pathogenic Avian Influenza Virus on the Efficacy of Different Avian Influenza Vaccines

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ABSTRACT

This study aims to investigate the influence of different challenge doses of HPAIV on the efficacy of two different types of inactivated AI vaccines H_5N_1, and H_5N_2. Groups of specific pathogen free chicken (SPF) were vaccinated with the recommended dose by the manufacturer, and another group was kept as control. Four weeks post vaccination (WPV) both vaccinated and control chicken groups were bled for the detection of Ab titer in response to vaccination using HI test. The results revealed that the Ab titer produced with H5N1 vaccine was 8 log2 and 7 log2 for H5N2 vaccine .The vaccinated chicken with the two vaccines were subdivided into 4 subgroups to be challenged by the doses (10^4, 10^5, 10^6, and 107) EID_{50} of HPAI challenge virus. It was calculated by recording deaths for each vaccine. The protection percent of the chicken vaccinated with H5N1 vaccine was 100% in case of all AIV challenge doses while it was 90% for the chicken groups vaccinated with H5N2 in cases of (10^4,10^5 ,10^6) EID_{50} challenge doses and 85% in case of 10^7EID_{50} challenge dose. Oropharyngeal swabs were taken to estimate viral shedding for each challenge dose by viral reisolation using SPF ECE and qrRT-PCR. Results of viral reisolation in SPF ECE shows reduction in shedding. The (10^4,10^5,10^6 and10^7)EID_{50} challenge doses of HPAIv reduced the viral shedding by ($10^{4.5}$,$10^{5.2}$, $10^{6.1)}EID_{50}$ and $10^{7.2}$ EID_{50} for H5N1 vaccine, While the reduction was lesser in case of H5N2 vaccine for the challenge doses by ($10^{4.5}$,$10^{5.2}$,$10^{4.1}$ and$10^{3.7}EID_{50}$)respectively. The rRT-PCR results were ($4.1x10^4$, $1.1x10^5$, $4.0x10^5$and $1.2x10^6$) reduction in shedding by doses (10^4, 10^5, $10^6$and 10^7) EID_{50} of HPAI challenge virus. These results demonstrate that chicken vaccinated with good quality inactivated AI vaccines under good condition were protected from clinical signs and deaths caused by AIv infection and the shedding of the virus was minimized even with high challenge dose.

Keywords: Avian Influenza virus, H5N1,H5N2, Shedding, Challenge

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CONTENTS

	Page
1. INTRODUCTION	1
2. REVIEW OF LITERATURE	5
2.1. History of Avian Influenza (AI)	5
2.2. Classification	8
2.3. Strain nomenclature	9
2.4. Morphological characters	10
2.5. Physicochemical properties	10
2.6. Genomic organization	12
2.7.Protein structure of virus	13
2.8. Biological properties	16
2.8.1. Replication cycle	16
2.8.2. Cultivation	22
2.8.3. Haemagglutination	24
2.9. Antigenic properties	25
2.10. Antigenic variation of Al virus strains	26
2.10.1. Antigenic drift	28
2.10.2. Antigenic shift	28
2.11. Virus Pathogenicity	29
2.12. Host Susceptibility	30
2.12.1. Wild birds	30
2.12.2. Domestic birds	31
2.12.3. Infection of mammals	33
2.12.4. Reservoir	34
2.13. Transmission and Carriers	34
2.14. AI Vaccine	35
2.14.1. Inactivated vaccines	35
2.14.2. Recombinant vaccines	38
2.14.3. Other novel vaccines	38
3. MATERIALS AND METHODS	45
3.1 Material	45

3.1.1. Experimental Chickens 45
3.1.2. Embryonated chicken eggs 45
3.1.3. Avian influenza vaccine 46
3.1.4. Antigen and antisera 46
3.1.5. Challenge virus 46
3.1.6. Normal saline 46
3.1.7. Washed RBCs 47
3.1.8. Swabs for sampling 47
3.1.9. Culture media 47
3.1.10. Materials used for quantitative rRT-PCR 48
3.1.11. Materials used for RNA extraction 49
3.1.12. Other materials 50
3.1.13. Apparatus and equipment used 50
3.2. Methods 51
3.2.1. Identity test 51
3.2.2. Safety and Completion of inactivation test 52
3.2.3. Sterility tests 52
3.2.4. Potency and efficacy 53
3.3. Experimental Design 61
4.**RESULTS** 63
4.1.Sterility test 63
4.2.Safety and compeletion of activation tests 64
4.3.Results of identity test 64
4.4.Resultes of immune response using serological tests 65
4.5.Results of Potency test 67
4.6.Evaluation of viral shedding using rRT- PCR technique and ECE 70
5. Discussion 73
6. Summary 80
7. References 82
8.Abbreviations
9. Arabic Summery

LIST OF TABLES

No.	Title	Page
1.	Oligonucleotide primers sequence.	49
2.	Oligonucleotide probes sequence.	49
3.	The thermal profile of the rRT-PCR	57
4.	Experimental design.	61
5.	Resultes of sterility test of inactivated monovalent influenza virus vaccines.	63
6.	Results of safty and compeletion of inactivaton tests of H5N1 and H5N2 AI vaccines .	64
7.	Result of mean antibody titer and seroconversion % of chicken vaccinated with the tested inactivated H5N1 and H5N2 vaccines using homologus Ags.	66
8.	Results of protection percent of chicken vaccinated with the tested H5N1 vaccine due to the use of different challenge doses of HPAI virus.	68
9.	Results of protection percent of chicken vaccinated with the tested H5N2 vaccine due to the use of different challenge doses of HPAI virus.	69
10.	Protection percent and viral shedding using ECE and rRT-PCR related to challenge dose.	72

LIST OF FIGURES

1.	Result of mean antibody titer of chicken vaccinated with the tested inactivated H5N1 and H5N2 vaccines	**66**
2.	Result of seroconversion % of chicken vaccinated with the tested inactivated H5N1 and H5N2 vaccines	**67**
3.	Protection percent of H5N1, H5N2 vaccines using different challenge doses of HPAI viruses	**70**

INTRODUCTION