Department of Poultry Diseases

"Evaluation of Different Commercial Vaccines, and Vaccinal Programs of Infectious Bronchitis Disease Used in Broiler Chickens"

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List of abbreviations

AGP	Ager gel precipitation
Ag	Antigen
AGID	Agar Gel Immunodiffusion
AGPT	Agar Gel precipitation test
Ark 99	Arkansas
Arg	Argnine
aMPV	Avian metapnemovirus
bP	Base pair
BLAST	Basic Local Alignment Search Tool
CAM	chorioallantoic membrane
cDNA	copy- DNA
CE	chicken embryo
CEK	chicken embryo kidney
C-ELISA	antigen–capture ELISA
CEF	Chicken embryo fibroblast
CEK	Chicken embryo kidney
CDC	Centers for disease control and prevention
CH	Challenged
CIS	Cross--immunization study
CMI	Cell mediated immune response
CIT	Cross-immunization test
Conn 46	Connecticut
CRBCs	chicken red blood cells
CNV	Challenged non-vaccinated
CT	Threshold cycle
DFA	Direct fluorescent antibody
DNA	Deoxyribonucleic acid
dpi	Day post-infection
DW	Distilled water
ELISA	Enzyme Linked Immunosorbent Assay

EM	Electron Microscopy
ECE	Embryonated chicken eggs
E	Envelope protein
EDTA	Ethylene diamine tetra acetic acid
Egy.	Egypt
EID50	Embryo infective dose fifty
EMBL	European Molecular Biology Laboratory
GI	Genomic identification
Glu	Glutaraldehyde
GOVS	General organization for veterinary services
HA	Haemagglutination
HEPA	High Efficiency Particulate Air
HI	Haemo agglutination inhibition
HG	Harderian gland
H&E	Hematoxylin and eosin
HVT	Herpesvirus of turkeys
HVR	Hyper- variable region
IBD	Infectious bursal disease
IBV	Infectious bronchitis virus
IFA ML	Immunofluorescence assay maximum likelihood
ILT	Infectious laryngotracheitis
Igs	Immunoglubulines
IPA	Immunoperoxidase assay
M	Membrane glycoprotein
Mabs	Monoclonal antibodies
Mass41	M41
MEM	Minimal Essential Medium
MG	*Mycoplasma gallicepticum*
MS	*Mycoplasma synoviae*
MP	Membrane protein
Min	Minutes
mRNA	Messenger RNA
N	Nucleocapsid protein

List of abbreviations

NDV	Newcastle disease virus
NIBV	Nephropathogenic IBV
OIE	Office des epizootic international
PHA	Passive Haemagglutination
PCR	Polymerase chain reaction
PI	Post-inoculation
PBS	Phosphate buffer saline
PI	Post inoculation
PM	Post-mortem
RBD	Receptor binding domain
RFLP	Restriction fragment length polymorphism
RNA	Ribonucleic acid.
RNP	Ribo nucleoprotein complex
RRT-PCR	Real-Time Reverse transcriptase-PCR
SN	Serum neutralization test
Sec	Seconds
S1	Spike 1
Ser	Serine
SPF	Specific pathogen free
TBE	Tris- Borate EDTA
TCoV	Turkey coronavirus
TOC	Tracheal organ culture
Var	Variant
VN	Virus neutralization
UTR	Untranslated region

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6- Summary and conclusion

In this study the prevalence of IB among Egyptian chicken broiler farms was studied by examination of 100 chicken broiler farms distributed in 4 governorates (Assiut, Sohag, El-minia, and El-Wady El-Gadid) during the period from 2017 to 2018 using RRT-PCR. It was found that 75/100 (75%) of the flocks were positive for IBV. In relation to the vaccination, the results showed that 57flocks were vaccinated with H120 live vaccine at one - day old and IBV were found in 43 of them with percent 75%. While in the non-vaccinated flocks (43 broiler flock) there were 32 flocks found to be infected with IBV with percent of 74%.It is clear that the percentage of infection in non-vaccinated flocks is higher than that reported in vaccinated ones.

The clinical examination of the investigated flocks revealed general signs of illness, respiratory signs and renal problems in some flocks. The respiratory signs ranged from mild to severe, gasping, sneezing, rales and coughing. Mortality rates ranging from 4-12 %. At necropsy, the main lesions found were tracheitis, lung congestion, and air-sacculitis. Some flocks frequently showed mucous or caseated material in trachea and bronchi. Pale or congested and enlarged kidneys with slight to moderate distention of the ureters with urates were also seen. The results of virus isolation of IBV in 9-11 day old ECE showed that the virus causes subcutaneous haemorrhage, curling and dwarfing after five several passages.

In the present study, partial S1 gene flanking the HVR 3 was amplified and used for typing the field isolates in Egypt. Five IBV isolates from different commercial poultry farms in Upper Egypt were analyzed by sequencing of the HVR 3 in S1 gene. The molecular data indicated that the IBV isolated in Upper Egypt from 2017 to 2018 were related to each other (90-98% identity) and according to phylogenetic analysis

isolates are found to be closely related to the variant isolates and were clustered within the Egy/Var- II subgroup (IBV-Eg-12120s-2012 and IBV/IS/885-00) and other Egyptian related strains deposited in the GenBank database.

By performing in vivo protection study, it was possible to demonstrate the level of protection of currently available live IBV Massachusetts, 793/B (1/96), (Mass/D274) and 1212B (IBVAR2) vaccine strains. The highest protection afforded by the vaccination program (D274-H120)-H120 with protection 40%, while the lowest effective vaccination program was 1212B-H120 with protection 17.3% after challenge with the isolated strain using ciliary activity, and histopathology.

In conclusion, according to this work, no vaccine regime used in the current study was able to fully protect vaccinated chickens from the current circulating variant viruses of IBV in Egypt. However, different degrees of protection have been obtained. It is recommended to design vaccination programs using respiratory virus vaccines, including Newcastle disease virus, avian influenza and infectious bronchitis, in addition to standard management practice must be performed to avoid the secondary bacterial infections. It was shown that the immunity against IBV is more complex so more work is needed to establish the underlying immune mechanisms for such higher and broader protection conferred by this vaccination programme.