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**Title: Evaluation of immunogenicity resulting from the injection of killed Newcastle disease genotype VII and avian influenza (H9N2) vaccines in broiler chickens**

Abstract:

Newcastle disease and avian influenza are two important viral diseases that have presented serious challenges to the global poultry industry. The low-pathogenic influenza virus endemic in Iran (H9N2) is the only influenza virus against which vaccination is carried out in our farms. This vaccine, which was also used in the present study, is a type of killed and identical vaccine. Unfortunately, new reports from around the world indicate that GVII of Newcastle disease virus has become the dominant and circulating strain in poultry farms. According to studies in recent years, it has been reported that this genotype was responsible for the fourth and fifth panzootics of Newcastle disease. Typically, in laboratories, in order to perform the HI test to evaluate the antibody titer resulting from vaccination with Newcastle disease virus, the GI basic antigen is used. This genotypic difference between the antigen used in the test and the circulating virus genotype causes differences and confusion in the HI test results. The present study aimed to investigate and evaluate the differences in antibody titers obtained from vaccination of broiler chickens with killed genotype VII vaccines when heterologous (GI) and homologous (GVII) antigens were used in diagnostic laboratories. In this study, 420 one-day-old broiler chickens were prepared and classified into seven groups and two subgroups. Five types of dual killed Newcastle (GVII) and influenza (H9N2) vaccines were used in this study. Vaccine injections were performed in these chickens at two time intervals of one day and seven days of age. After weekly blood sampling from the chickens, serum samples were sent to the veterinary laboratory, where titer measurements were performed with both homologous and heterologous antigens using the HI test. The results of this study showed that if the HI test is performed using the usual GI antigen with the injected vaccine strain, the antibody titers show a difference of about one to two logs, which can be effective in assessing the level of herd immunity. Also, other results obtained from the present study indicated that injecting twice the vaccine dose and also injecting the first dose of killed vaccine at the age of seven days, in both Newcastle disease and influenza, increases the antibody titer and also increases herd immunity.

**Keywords:** Newcastle disease - Influenza disease - Killed vaccine - NDV G VII - Broiler chickens