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# Newcastle Disease Vaccination in Guinea Fowls (*Numida meleagris galeata*): Clinical and Immunological Parameters

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**Abstract:** Clinical and immunological aspects of vaccinated Guinea fowls against Newcastle disease were evaluated. Three hundred birds were distributed into four different experimental groups, vaccinated or not against Newcastle disease (ND): G1 (Ulster 2C strain), G2 (B1 strain), G3 (LaSota strain), G4 (LaSota strain inactivated and emulsified in mineral oil) and G5 (not vaccinated -control). The immune response was evaluated by the HI test. The vaccinations of Guinea fowls with NDV Ulster 2C, B1, LaSota and LaSota strain inactivated and emulsified in mineral oil strains did not cause any clinical signs associated with post-vaccinal reactions and were similar in the humoral immune response stimulus (HI).

**Key words:** Guinea fowl, vaccination, Newcastle disease, *Numida meleagris galeata*, Ulster 2C, B1 and LaSota strains

## Introduction

Newcastle disease (ND) remains one of the most important poultry viruses, with highly infectious capacity, affecting both domestic and wild birds. It is also one of the main sanitary barriers for the free trade of poultry and poultry products (OIE, 1996). The disease is currently world-wide distributed in a large range of hosts, with 27 of the 50 orders of birds reported to be possibly infected by this agent (Kaleta and Baldauf, 1988). One of the affected species is the Guinea fowl, which is commercially produced in several countries and also in the north-eastern states of Brazil, for meat and feathers. However, there is little information available on health programs in this species. The aim of this study was to evaluate the humoral antibody response and clinical parameters of Guinea fowls vaccinated against Newcastle disease.

## Materials and Methods

Experimental birds and management: 300 Guinea fowls from one to 84 days of life were distributed in a completely randomized experimental design with five different treatments, with three replicates of 20 birds each. Birds were designated to treatments, according to vaccination strain as G1 (Ulster 2C), G2 (B1), G3 (LaSota), G4 (LaSota strain inactivated and emulsified in mineral oil) and G5 (not vaccinated-control). Guinea fowls were allocated in experimental floor-pen housed, receiving water and feed *ad libitum*. The feed was formulated with corn and soybean according to INRA (1984) recommendations.

**Vaccines:** Commercial line NDV vaccines (Ulster 2C, B1 and LaSota strains) were administered to each experimental group, as described by Paulillo *et al.* (1996). Birds were vaccinated at 15 days of age and revaccinated at 35 and 56 days of age with the same vaccine strain that was applied in the first vaccination. Vaccine titers were obtained by determining 50% of the embryo-infecting dose in embryonated eggs of specific-pathogen-free breeders at 8 and 10 days of incubation. Titers of live vaccine strains Ulster 2C, B1 and LaSota were 7.15 log10/0.1mL, 7.2 log10/0.1mL and 7.35 log10/0.1mL, respectively. Titer of the inactivated vaccine with LaSota strain was 9.5 log10/0.1mL and this vaccine was emulsified in mineral oil. Birds were vaccinated and revaccinated by eye drop (Ulster 2C, B1 and LaSota) and subcutaneously (LaSota inactivated).

**Serology:** Blood samples of Guinea fowls were collected from the jugular and ulnar superficial vein, from fourteen to 84 days of age, at regular seven days intervals. Sera were inactivated at 56°C for 30 minutes, frozen and stored at -20°C. Sera samples were submitted to inhibition of hemagglutination (HI) test, according to Cunningham (1971).

Table 1: Mean antibody titres measured by HI test ($log_2$) of Guinea fowls (*Numida meleagris galeata*) submitted to different vaccination programs against ND

| | | Mean antibody titers measured by HI test ($log_2$) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Guinea fowls ages (days) | | | | | | | | | | |
| Group | Vaccine | 14 | 21 | 28 | 35 | 42 | 49 | 56 | 63 | 70 | 77 | 84 |
| I | Ulster 2C | 0.0 | 0.0 | 3.0$^{a}$ | 2.5$^{b}$ | 4.5$^{a}$ | 4.2$^{a}$ | 3.3$^{b}$ | 5.8$^{ab}$ | 5.2$^{ab}$ | 4.5$^{b}$ | 4.2$^{a}$ |
| II | B1 | 0.0 | 0.0 | 2.5$^{a}$ | 2.5$^{b}$ | 5.2$^{a}$ | 4.8$^{a}$ | 5.0$^{a}$ | 6.0$^{a}$ | 5.0$^{b}$ | 5.8$^{a}$ | 4.8$^{a}$ |
| III | LaSota | 0.0 | 0.0 | 2.7$^{a}$ | 3.7$^{a}$ | 5.3$^{a}$ | 4.5$^{a}$ | 5.0$^{a}$ | 6.0$^{ab}$ | 7.0$^{a}$ | 6.8$^{a}$ | 4.5$^{a}$ |
| IV* | LaSota (oil) | 0.0 | 0.0 | 3.7$^{a}$ | 2.8$^{ab}$ | 2.5$^{b}$ | 2.3$^{b}$ | 2.5$^{b}$ | 4.2$^{b}$ | 4.3$^{b}$ | 4.2$^{b}$ | 4.2$^{a}$ |
| V** | Control | 0.0 | 0.0 | 0.0$^{b}$ | 0.0$^{c}$ | 0.0$^{c}$ | 0.0$^{c}$ | 0.0$^{c}$ | 0.0$^{c}$ | 0.0$^{c}$ | 0.0$^{c}$ | 0.0$^{b}$ |

*Group that was also vaccinated with Ulster 2C strain at 15 days of age. **Control group-not vaccinated against ND. 1-Means followed by the same letter, in the same column, are not different at 5% of probability by Tukey test ($p > 0.05$)

The data were analyzed by ANOVA and those with statistical differences were submitted to Tukey´s test at 0.05% using Statview® (version 5.0).

## Results and Discussion

Guinea fowls from all groups vaccinated or not against ND did not show any clinical signs of post-vaccinal reactions.

Mean antibody titers against NDV from Guinea fowls are shown in Table 1. At fourteen days of age, none of the birds showed maternally-derived antibodies against NDV, as breeders were not submitted to any vaccination programs against this disease. As the control group (G5) was not vaccinated, its antibody titers were null from fourteen to 84 days of age.

At 28 days of age, antibody titers against NDV were detected in the vaccinated groups. This active immunity was induced by vaccination at 15 days of age. Guinea fowls were revaccinated at 35 and 56 days of age and this procedure maintained antibody titers against NDV up to 84 days of age. The low diffusion potential of the Ulster 2C strain (McFerran and Nelson, 1971) and the low invasion capacity of the B1 strain (Hofstad, 1951) may explain the low to moderate antibody titers detected by HI in vaccinated guinea fowls. On the other hand, the low to moderate antibody titers detected for the Guinea fowls vaccinated with the LaSota (inactivated or not) strain (G3 and G4) are not compatible with the great diffusion potential of this strain (Winterfield *et al*., 1957). The Tukey test did not demonstrate significant differences among groups vaccinated with Ulster 2C, B1 and LaSota (inactivated or not) strains. The analysis of these serological results clearly shows that Guinea fowls produce antibody when vaccinated against NDV.

**Conclusions:** The conclusions of the present study are that Guinea fowls showed a moderated antibody response when vaccinated with commercially available vaccines for chickens against Newcastle disease, without any clinical signs of post-vaccinal reaction.

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