SHORT COMMUNICATION

Avian Leukosis Virus in Hatchable Eggs of Commercial and Free-Range Chickens

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SUMMARY

Avian leukosis is caused by various avian retroviruses which induce a variety of benign and malignant neoplasm in chickens with subsequent economic losses to the poultry industry. A survey of avian leukosis in hatchable eggs of apparently healthy chickens was carried out in an attempt to determine the prevalence of avian leukosis virus (ALV) in exotic breeders and free-range indigenous chickens in Oyo state. A total of 188 (76 exotic breeders and 112 free-range chickens) albumen of hatchable eggs were obtained from 3 different commercial breeder farms and 12 free-range indigenous chicken farms. Eggs were tested by an antigen capture enzyme-linked immunosorbent assay (ELISA) technique. Eleven out of the 76 albumen obtained from eggs of exotic breeders tested positive to ALV antigen which represents 14.5% while 37 of the 112 albumen from free-range indigenous eggs were confirmed as positive representing 33%. Overall prevalence rate of 25% was recorded for all eggs sampled with the highest prevalence of ALV antigen detected in free-range indigenous chickens than the exotic chickens. The results emphasizes the control of the Avian Leukosis transmission by including both exotic and free-range indigenous birds as wells as the use of ALV free eggs in hatcheries.

Keywords: *Prevalence, Avian leukosis, Albumen, ELISA.*

INTRODUCTION

Avian leukosis is a neoplastic disease caused by avian leukosis viruses. It is a member of the leukosis/sarcoma group of avian retroviruses, commonly referred to as avian leukosis viruses (ALVs). They are classified into subgroups; A, B, C, D, E, J and K (Kahn, 2005) based on the variation in their envelope glycoprotein, nucleotide sequence, virus-serum neutralisation techniques, virus interference, and host range (Fadly and Payne, 2003).

Subgroups A, B, C, D, J and K are oncogenic and exogenous ALVs (Cui *et al*., 2014), while subgroup E is endogenous and regarded as having extremely low pathogenicity (Fadly and Nair, 2008). Avian leukosis virus can be transmitted either by vertical or horizontal routes through contact (Mohammadi *et al*., 2008). Vertical transmission is most important by infection of the egg white in infected breeders. This route of congenital infection leads to strong associations between the presence of virus in vaginal swabs, egg albumen and embryos, the detection of which provides the basis for ALV eradication programs in breeding stock (Olabode *et al*., 2009).

Lateral transmission is poor but infection may occur by the faecal-oral route, especially in young birds. Poultry vaccines contamination has also been reported as a way of avian leukosis virus transmission (Yaqing et al., 2020). Poultry vaccines and other live virus vaccines produced using embryonated eggs from infected breeder hens and tissues prepared from such embryos may harbour

some of these retroviruses (Sacco, *et al*., 2000). This study aimed at investigating the presence and prevalence of avian leukosis antigen in hatchable eggs collected from exotic and free-range indigenous in Oyo state and provide information on the presence of the virus in Southwest Nigeria which is the main hub of poultry breeders that distribute poultry stocks throughout the country and neighboring country of Republic of Benin.

METHODOLOGY

Total of 188 chickens were sampled for laboratory analysis. ELISA kit manufactured by IDEXX laboratories USA was used for detection of ALV antigen in accordance to the manufacturer's description. Briefly, 100 µl of egg albumen was dispensed into the wells coated with the antigen p27 antibody. After 1 hour of incubation, wells were washed and 100 µl of rabbit anti-p27 HRPO conjugate was added into each well and reaction detected with TMB substrate and the absorbance readings at 650-nm using ELISA reader (Biotek EL 800).

RESULT AND DISCUSSION

In this study, a general prevalence rate of 25% was recorded for all samples collected. Total of 188 (76 from exotic and 112 from free-range indigenous) hatchable eggs were sampled for ALV antigen using ELISA technique. A total of 11 samples from the 76 albumen obtained tested positive to ALV which represents 14.5% in the commercial breeder birds. Positive samples were obtained from all three commercial breeder farms in the following order, 2/11 (18%), 8/28 (28%) and 1/37 (3%).

In albumen of eggs collected from free-range indigenous birds, 37 of 112 eggs were positive for ALV, representing 33% of the total samples from the free-range birds. Of the 12 locations sampled, nine locations were positive representing 75% of all locations sampled for free-range indigenous chickens.

This is the first report of ALV in hatchable eggs of free ranging chicken in South West Nigeria although the disease is known to be present in Nigeria.

Emikpe et al., (2007) showed a 70.7% seroprevalence to ALV out of 128 sera collected from free-range indigenous poultry in South West Nigeria while Kumbish et al., 2015 reported the disease in commercial egg type chickens. With the absence of ALV vaccine for prevention of the disease around the world, antigen detection in eggs or birds is an evidence of the presence of a field virus.

In this study a prevalence rate of 14.5% (11/76) in exotic and 33% (37/112) in indigenous hatchable eggs was recorded for ALV antigen while Emikpe *et al*. (2007) reported prevalence rate of 70.7% for the p27 antigen of all subgroups of ALV. A general prevalence rate of 91% for p27 antigen that is common to all subgroups of ALV including endogenous and exogenous viruses was also observed by Kumbish et al., 2015.

Despite implementation of several eradication programmes and development of breeding lines of chickens resistant to avian leukosis by several breeding companies ALV is still prevalent in commercial breeder and backyard poultry farms. While eradication programmes are strictly monitored and implemented in commercial breeder farms, such programmes are not carried out in the backyard poultry farms. The lack of eradication programmes in free ranging chickens could explain the higher rate of ALV antigen in free ranging chicken.

The ALV antigen in eggs of free-range indigenous birds at a prevalence rate of 33% shows an increasing rate over the years as reported to be less than 5% by Owoade *et al.* (2006) and Olabode *et al.* (2009) to be 1.25% in other regions respectively. Thus a lower flock seroprevalence of ALV would correspond to the lower infectivity of this virus (Fadly and Payne, 2003) and higher seroprevalence rate would also correspond to

a higher infectivity rate. As the Leukosis viruses which are shed in feces becomes inactivated in the environment within days (Saif *et al*., 2003), egg infection and subsequent vertical transmission is of great concerns in the poultry industry.

The increasing trend of ALV prevalence in free ranging chicken suggests that control programmes focussing only in commercial chicken are ineffective.

CONFLICT OF INTEREST

Authors do not have any conflict of interest

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