

Seroprevalence of *Ornithobacterium rhinotracheale* in broiler breeders in India

Surajit Baksi*, Nirav Rao, Pravinsinh Chauhan

Hester Biosciences Limited, Ahmedabad, Gujarat, India.

Received: 18.Nov.2017; Accepted: 12.Dec.2017; Published: 25.Dec.2017

*Corresponding author: Surajit Baksi; Email: drsbaksi_vm@yahoo.com



Abstract

Respiratory infections in poultry are the major group of diseases which cause significant economic losses to poultry industry. *Ornithobacterium rhinotracheale* are the bacteria which cause Ornithobacteriosis (ORT) to the avian species. This bacterial infection causes respiratory symptoms and high mortality among chickens. Broilers and particularly breeders species are affected the most in farms in India and other countries worldwide. It is important to prevent the infection with proper biosecurity measures and vaccinations. But, still, the disease is prevalent in many parts of the world. In the present study, serum samples from seven states of India were collected and studied for the presence of antibodies against ORT. 74.37% samples were found positive for ORT infection. Age and season wise study was also conducted to investigate the effect of these parameters on the occurrence of the disease. The samples were divided into four age-wise groups i.e., 17-30, 31-40, 41-50 and 51-62 weeks. Samples of 41-50 weeks age showed highest positive results (87.50%) compared to other ages. Samples were divided into season-wise groups i.e., Winter, Summer, and Monsoon. Birds were found highest positive for ORT infection in monsoon (88.31%) and lowest in winter (62.20%). ORT was found highly prevalent in India, proper biosecurity measures and vaccination programs are required to prevent the spread of disease.

Keywords: *Ornithobacterium rhinotracheale*, India, Seroprevalence, Poultry, Broiler.

Cite this article: Baksi, S., Rao, N., Chauhan, P., 2017. Seroprevalence of *Ornithobacterium rhinotracheale* in broiler breeders in India. PSM Vet. Res., 2(2): 29-32.

INTRODUCTION

Respiratory infections are the most serious group of diseases of poultry, accompanied by heavy economic losses. Various pathogens have been identified as etiologies of respiratory disease, acting either primarily or secondarily. *Ornithobacterium rhinotracheale* infection, also known as ornithobacteriosis, is a contagious disease of avian species, primarily in turkeys and chickens, causing respiratory distress, decreased growth, and mortality (Chartlon *et al.*, 1993; Chin *et al.*, 2003). *Ornithobacterium rhinotracheale* (ORT), named by Vandamme *et al.* (1994), has been associated with respiratory disease, increased mortality, retarded growth and decreased egg production in avian species. ORT is a Gram-negative, pleomorphic, rod shaped, and non-motile bacterium (Vandamme *et al.*, 1994). ORT is considered as a primary pathogen in poultry (Van and Hafez, 1999; Zorman *et al.*, 2000), the severity of clinical signs, duration of the disease, and mortality are extremely variable and are influenced by housing environmental stressors such as poor management, inadequate ventilation, high ammonia levels, high stocking

density, poor litter conditions, poor hygiene, foodborne mycotoxins, suboptimal nutrition, and concomitant infectious diseases (Chin *et al.*, 2003; Canal *et al.*, 2005). The disease is of significant concern to the poultry industry because of its potential economic impact. ORT has been reported in the United States, Germany, South Africa, the Netherlands, France, Belgium, Israel, Japan, Hungary, Iran, Turkey and the United Kingdom (Chartlon *et al.*, 1993; Hafez, 1994; Hinz *et al.*, 1994; Van Beek, 1994; Dudouyt *et al.*, 1995; Travers, 1996; Joubert *et al.*, 1999; Banani *et al.*, 2000; Sakai *et al.*, 2000; Banani *et al.*, 2002; Turan and Ak, 2002; Allymehr, 2006). The severity of infection and losses to the producers makes protection against it very important. The poultry industry in the India is facing threat due to emerging respiratory diseases that result in severe economic losses. Hence this study is aimed at finding out seroprevalence of ORT in broiler breeder birds in various states of India, which will help in understanding spread and awareness of disease.

MATERIALS AND METHODS

Broiler breeder farms were selected for study of seroprevalence of ORT. Total 476 serum samples from broiler breeder birds, age between 17 to 62 weeks were collected. Blood sample were collected from wing vein of Birds. Blood samples were collected using 2.5 ml syringe, 23 gauge needles, 70 percent alcohol solution and cotton. Collection site was disinfected by swabbing with 70 percent alcohol. After blood collection, samples were kept at room temperature for next few hours until the blood clot. After clot, serum samples were separated.

Seven states (Maharashtra, Telangana, Andhra Pradesh, Haryana, Madhya Pradesh, Karnataka, Tamil Nadu) of India were selected. 60 samples from Maharashtra, 74 samples from Telangana, 114 samples from Andhra Pradesh, 91 samples from Haryana, 21 samples from Madhya Pradesh, 54 samples from Karnataka and 62 samples from Tamil Nadu were collected from different farms in respective states. The birds were ageing between 17-62 weeks and randomly selected for blood collection. The birds were healthy and free from any clinical signs of diseases at the time of blood collection. After blood collection, serums were separated and stored in -20 °C deep freezer until testing.

Ornithobacterium rhinotracheale Antibody Test Kit from IDEXX Laboratories (USA) was used for finding out presence of antibodies against ORT. All reagents were allowed to come to room temperature before use.

The results were recorded according to following manners:

1. State from where samples were collected
2. Age groups of birds (17-30, 31-40, 41-50, 51-62 weeks)
3. Season in which samples were collected (Winter, Summer, Monsoon)

RESULTS

476 serum samples were collected from various farms of India and ELISA test was performed with IDEXX kit for seropositivity of antibodies against ORT. In the study, 354 out of 476 samples were found positive for ORT antibodies. 74.37% were positive and 25.64% were negative. Out of seven states taken into study, Andhra Pradesh recorded highest positive samples for seroprevalence of ORT with 82.46% as mentioned in Figure 1. Samples of Haryana state was found least seropositive with 63.74%. All samples were divided according to age groups of birds also (Figure 2), where birds of age between 41-50 weeks showed highest seroprevalence of ORT (87.5%).

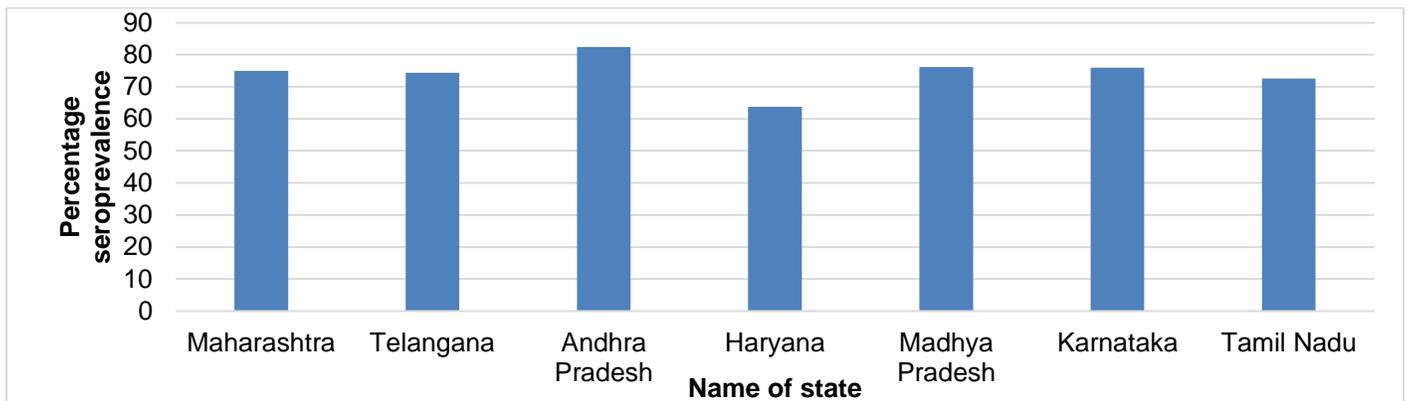


Fig. 1. State-wise seroprevalence of *Ornithobacterium rhinotracheale* in Broilers in India

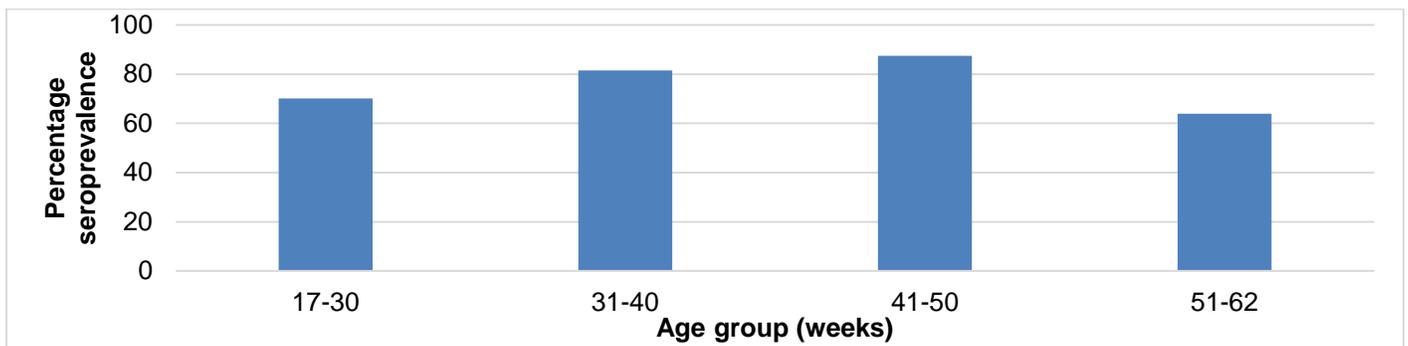


Fig. 2. Age-wise seroprevalence of *Ornithobacterium rhinotracheale* in Broilers in India.

The samples were also divided into groups according to different seasons and data were collected, where 88.31% samples were found positive for ORT in monsoon season (Figure 3).

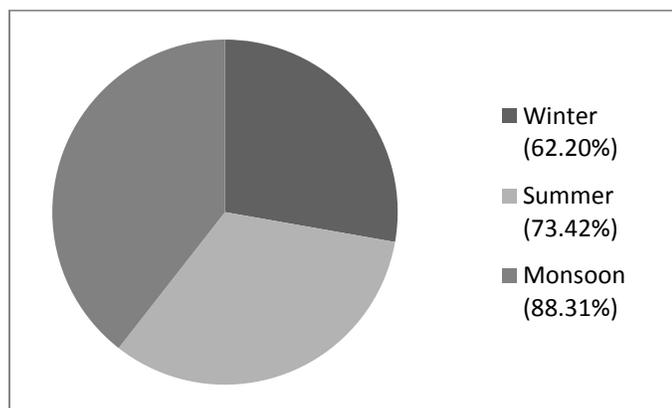


Fig. 3. Season-wise seroprevalence of *Ornithobacterium rhinotracheale* in Broilers in India

DISCUSSION

Out of 476 serum samples collected from seven states of India, 354 samples (74.37%) were found positive for presence of antibodies against ORT. Serological tests are useful for flock monitoring and diagnosis of ORT infection. Serological method is more advantageous than bacteriological method as antibodies persist in the body of birds for several weeks after infection. The samples were analyzed by ELISA method using kit supplied by IDEXX Laboratories. ELISA is the most accurate and reliable method now a days to find out presence of antibodies against ORT (Niwat *et al.*, 2007). Similar study was conducted by Niwat *et al.*, (2007) and Seifi (2012) where 100% and 71% seroprevalence was found in broilers respectively. In Andhra Pradesh state, 82.46% seroprevalence was found which was the highest among all seven states. The samples were also divided in different groups as per age and seasons. Birds of age group of 41-50 weeks recorded highest seroprevalence (87.5%), other researchers also performed age wise study (Niwat *et al.*, 2007). There were wide changes in climate in different regions of India. Environmental temperature, sunshine hours, Relative humidity, and number of rainy days are climatic factors affecting growth, production, reproduction and health of Birds. Monsoon season is the season where high risk of bacterial infection is there. In present study also, the samples collected in monsoon were highest positive (88.31%) compared to other seasons. Vaccination can be helpful to prevent the spread of disease as there are many instances of acquired resistance against

antibiotic worldwide (Murthy *et al.*, 2007; Bisschop *et al.*, 2004).

CONCLUSION

In conclusion, ORT is the significant respiratory disease of poultry particularly broiler breeder farms in India. It is prevalent in all seven states considered in present study. Poor cleaning, feed, water, biosecurity measures and cross-infection are the causes of occurrence of such type of diseases. The disease can be controlled by improvement in farming procedure, sanitation and vaccination of birds against the disease.

ACKNOWLEDGEMENT

The authors would want to thank Hester Biosciences Limited, Ahmedabad, Gujarat, India, for supporting this investigation, and staff of Broiler breeder farms for their kind help in collection of blood samples.

CONFLICT OF INTEREST

The writers have announced that no contending interest exists.

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