



# INVESTIGATION OF BACTERIAL PATHOGENS IN PORCINE PNEUMONIA

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## Abstract

*The present study was conducted to determine the bacterial etiopathology of pulmonary infections in piglets, considering the increased incidence of mortality of piglets in Thrissur district, Kerala. Salmonella enterica serovar Choleraesuis (15), E.coli (5), Proteus sp.(3), Staphylococcus sp.(2) and Actinobacillus (1) were isolated from lungs collected from 25 porcine carcasses having respiratory lesions. No organisms could be isolated from two lungs which showed lesions. Collected lung samples showed lesions depicting circulatory, inflammatory, and ventilation disturbances or by combination of these changes. In most of the cases, the bronchial lymph nodes were swollen and congested, while the trachea showed presence of frothy or mucus exudates in lumen. Results of this study underscored the role played by Salmonella and E.coli in inducing respiratory infections, in addition to gastrointestinal disorders.*

**Key words:** Bacterial pathogens, pig, respiratory tract.

Infectious diseases especially respiratory and gastrointestinal infections are common in pigs. Great economic losses have been reported due to occurrence of

respiratory diseases in swine production leading to increased mortality, condemnation of diseased animals, reduced weight gain and increased drug costs. Bacterial agents such as *Pasteurella*, *Escherichia coli*, *Haemophilus parasuis*, *Staphylococcus* sp., *Streptococcus* sp. and *Actinobacillus* sp., have been frequently isolated from pigs. They cause different disease conditions including respiratory infections rendering the pigs more susceptible to viral infections. Pigs also serve as reservoirs for zoonotic pathogens that impart significant health and economic burden. Considering these factors, the study was formulated to delineate various bacterial pathogens causing respiratory infections in piglets.

## Materials and Methods

Twenty five piglet carcasses were subjected to postmortem examination and detailed examination of the respiratory system was done considering the increased incidence of respiratory lesions in piglet carcasses brought for necropsy examination to the Department of Veterinary Pathology, College of Veterinary and Animal Sciences, Mannuthy. For microbiological examination, lung samples were collected aseptically and streaked on Blood Agar (BA), Chocolate agar and Mac Conkey's Agar (MCA), followed by incubation at 37° C for 24 to 48 hours aerobically and anaerobically.

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Primary identification of bacteria at generic level was performed using Gram's reaction, KOH test, cellular morphology, growth or no growth on Mac Conkey's agar (MCA), catalase test, oxidase test and Oxidation-Fermentation (O-F) test (Quinn *et al.*, 1994). Later, secondary biochemical tests were carried out to identify the species of bacteria. The tests included Indole Test, Methyl Red (MR) test, Voges-Proskauer (VP) test, Citrate Utilization Test, Urease Test and Triple Sugar Iron (TSI) Agar Test for H<sub>2</sub>S production (Barrow and Feltham, 1993; Quinn *et al.*, 1994).

## Results and Discussion

The post-mortem examination of the piglets revealed interstitial pneumonia, bronchopneumonia, emphysema, pleurisy, fibrinous pneumonia, mild to severe pulmonary congestion, haemorrhage, pulmonary oedema, congested bronchial lymph nodes and frothy exudates in the tracheal lumen.

On bacteriological examination, 23 lung samples were found to be positive. No organisms could be isolated from two lungs which showed the lesions. Twenty six bacterial isolates belonging to various genera viz. *Salmonella*, *Escherichia*, *Staphylococcus*, *Actinobacillus* and *Proteus* were obtained from samples collected under sterile conditions. In this study, *Salmonella* organisms was the predominant organism, which were isolated from 60 per cent of examined porcine lung samples, followed by *E.coli* (20%), *Proteus* (12%), *Staphylococcus* (0.8%) and *Actinobacillus* (0.4%).

This systematic study on the bacterial etiopathology of pulmonary infections in piglets provided valuable knowledge regarding various bacterial agents involved in respiratory infections by conventional culture method. *Salmonella enterica* serovar Choleraesuis (15) *E.coli* (5), *Proteus* sp. (3), *Staphylococcus* sp. (2) and *Actinobacillus suis* (1) were isolated from lungs collected from 25 porcine carcasses having respiratory lesions. Similar causal agents were also described by various research workers (Ramachandran, 1970; Dosen *et al.*, 2007; and Faur *et al.*, 2010).

The rate of salmonellosis observed in this study is higher than that of Dosen *et al.* (2007), which could be due to variation in many factors including sample size, method of sampling, climate, geographical area, virulence of organism, carrier status of sows and management practices. The occurrence of *E.coli* infection was found to be 20 per cent. Anto *et al.* (2011) and Krithiga *et al.* (2012) also reported the prevalence of highly pathogenic *E.coli* in piglets having pneumonic lesions.

Results of this study underscored the role played by *Salmonella* and *E.coli* in inducing respiratory infections, in addition to gastrointestinal problems. This study also highlights the necessity of screening porcine pneumonic lung for *Salmonella* sp. and *E.coli* considering their high zoonotic potential.

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