

OCCURANCE OF *KLEBSIELLA* SPP. IN POULTRY: A POTENTIAL THREAT AFFECTING PUBLIC HEALTH

By

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ABSTRACT

The aim of the current study is to investigate the occurrence of *Klebsiella* spp. in poultry in Egypt. **Methods and findings:** Two hundred fifty chicken specimens were collected and cultured. *Klebsiella* spp. were isolated and identified. **Results:** 30/250 (12%) *Klebsiella* isolates could be recovered. **Conclusions:** The isolation of *Klebsiella* spp. from poultry highlights their possible role in the epidemiology of such pathogens.

INTRODUCTION

Klebsiella pneumoniae is a Gram-negative bacilli belonging to family *Enterobacteriaceae* and is the causative agent of many nosocomial infections. Recently, pathogenic strains of *K. pneumoniae* have been attributed to multi-systemic abscessation in both human and animals. Although *K. pneumoniae* causes a well-recognized zoonosis, information including adequate diagnostic methods or treatments for non-humans is scarce (Gast, 2003). *Klebsiella* spp. is an environmental contaminant that occasionally causes embryo mortality, yolk sac infections, and mortality in young chickens, turkeys, and ostriches. In addition, the organism has been associated with respiratory, ocular, septicemic, and reproductive diseases of poultry (El-Tras *et al.*, 2010; Kabilika *et al.*, 1999; Lin *et al.*, 1996; Orajaka and Mohan 1985 and Plessner *et al.*, 1975). Actually, it is a part from normal intestinal flora of poultry, but it could cause infections whenever the immune system of affected bird is compromise (Anonymous, 2006). It has been isolated from hatching eggs. Its incidence rate is (8.8%) (Dashe *et al.*, 2013). In human, *Klebsiella* spp. have been identified as colonizing hospital patients, where

spread is associated with the frequent handling of patients (e.g., in intensive care units). Patients at highest risk are those with impaired immune systems, such as the elderly or very young, patients with burns or excessive wounds, those undergoing immunosuppressive therapy or those with HIV/AIDS infection. Colonization may lead to invasive infections. On rare occasions, *Klebsiella* spp., notably *K. pneumoniae* and *K. oxytoca*, may cause serious infections, such as destructive pneumonia (Ainsworth, 2004). A characteristic syndrome has emerged in which liver abscess is accompanied by *K. pneumoniae* bacteremia and sometimes by endophthalmitis or meningitis. This is typically a community-acquired infection (Yu et al., 2007). Occurrence of *Klebsiella* spp. in poultry flocks signifies a great hazard in poultry industry and consequently humans. Therefore, the current study was conducted to investigate the occurrence of *Klebsiella* in poultry in Egypt.

Methods:

Sampling:

Two hundred fifty specimens (yolk sac, liver and gall bladder) were collected from dehydrated chicks showed diarrhea and off food in sterile containers and brought back to the laboratory of Microbiology Department, Faculty of Veterinary Medicine, and Cairo University. *Culture:* Under complete aseptic conditions, specimens were cultured and *Klebsiella* spp. have been isolated and identified according to (Forbes et al., 2002). Specimens were directly inoculated on MacConkey's agar from which mucoid late fermenter colonies were picked up for further biochemical identification. Indole production test, Methyl red test, Voges-Proskauer test, Citrate utilization test, Urea hydrolysis test and Triple sugar iron agar test were carried out to confirm the identity of the isolates.

RESULTS

Culture results: *Klebsiella* colonies on MacConkey's agar were mucoid late fermenter colonies.

Biochemical results: summarized in (Table 1)

OCCURANCE OF KLEBSIELLA SPP. IN POULTRY:

Table (1): Result and interpretation of six different biochemical tests on suspected mucoid late fermenter colonies.

	Indole	Methyl red	Voges-proskauer	Citrate utilization test	Urea hydrolysis test	TSI
Result	Colorless ring	Yellow color	Red color	Blue color	Pink color	Yellow butt and slant with Gas production
Interpretation	Negative	Negative	Positive	Positive	Positive	Positive

Isolated species: summarized in (Table 2).

Table (2): Isolation of *Klebsiella* spp. in poultry

	Number	Percentage (%)
Number of samples	250	---
Isolated <i>klebsiella</i> spp. from poultry	30	12
<i>Klebsiella pneumoniae</i>	23	76.7
<i>Klebsiella oxytoca</i>	7	23.3

DISCUSSION

Klebsiella pneumoniae is an important opportunistic pathogen accounting for many nosocomial bacterial infections. Epidemiological studies have revealed that the majority of *Klebsiella* infections are preceded by colonization of the patient’s gastrointestinal (GI) tract (**Badr and Abd El-Monaem, 2008**). In the present study, *Klebsiella* spp. has been isolated from poultry, representing a frequency of 12%. The isolation rate of klebsiella is very variable, ranging from 8.8 % (**Dashe et al., 2013**) up to 60 % (**Ajayi and Egbini, 2011**). Nowadays it is well known that *Klebsiella* represent a source of community acquired Pneumonia (CAP) (**Prasad, 2012**). This could be considered as a public health threat due to the potential hazard of transmission to humans (**Sharp, 1991**). More epidemiological studies are needed to study the prevalence and pathogenicity of other potentially pathogenic serotypes of *Klebsiella* spp.

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