



Cairo University



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**Epidemiological studies on transmission of avian pathogens from fish farms
to water fowls in Kafr El-Sheikh governorate**

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Abstract

Integrated Water fowls are common in Kafr El-Sheikh Governorate so the infection with many bacterial and /or viral diseases due to using poultry litter as a fertilizer in fish farms is true. In the present study 50 litter samples, 69 fish pond water samples, 200 fecal swabs from integrated water fowls and 60 samples from water fowls liver were collected for surveying some pathogens which may be present in litter and transported to fish pond and infect water fowls. Results of this survey revealed the isolation of 19 salmonella spp. (4 isolates from litter, 2 isolates from fish pond water, 8 isolates from fecal swabs of waterfowl and 5 isolates from waterfowl liver), 17 Staphylococcus spp. (7 isolates from litter, 3 isolates from fish pond water, 5 isolates from fecal swabs of water fowls and 2 isolates from water fowls liver); and 59 pathogenic *E.Coli* isolates (9 isolates from litter, 16 isolates from fish pond water, 22 isolates from fecal swabs of water fowls and 12 isolates from water fowls liver) isolates were obtained from different samples. Experimental infection with five chosen salmonella serotypes revealed clinico-pathological findings in different organs also mortality, feed conversion were recorded

Keyword: Epidemiology, Transmission, Salmonella, *E.Coli*, Staphylococcus Spp., Fish farms, Water fowls, Kafr El-Sheikh governorate.

Dedication

I want to dedicate this thesis to the soul of my father and my uncle (The martyr officer Ezat El-Shafaey) from them I learned a lot, to My mother, my wife and my daughter who have been a source of encouragement and inspiration to me throughout my life, and have actively supported me in my determination to find and realize my potential, and to make this contribution to our world.

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LIST OF ABBREVIATIONS

AAAP	American Association of Avian Pathologists
AI	Avian influenza:
AIV	Avian influenza virus
AL	Cell lysis solution
APEC	Avian pathogenic <i>E. coli</i>
APMV	Avian paramyxovirus
AW	Wash buffer
CDC	Centers for Disease Control
CFU	Colony-forming units
Cif	Clumping factor
CM	Chicken manure
CR	Congo red
DEFRA	Department for Environment, Food and Rural Affairs
dNTPs	Deoxynucleotide triphosphates
Dpi	Day post-infection
ECE	Embryonated chicken eggs
EHEC	Enterohaemorrhagic <i>E. coli</i>
EIEC	Enteroinvasive <i>E. coli</i>
EMB	Eosin Methylene Blue
EPEC	Enteropathogenic <i>E. coli</i>
<i>E. coli</i>	<i>Escherichia coli</i>
ETEC	Enterotoxigenic <i>E. coli</i>
ExPEC	Extra pathogenic <i>E. coli</i>
FAO	Food and agriculture organization
FBD	Food born disease
FCM	Fermented chicken manure
FDA	Food and Drug Administration
Fnbp	Fibronectin binding proteins
GAFRD	General Authority for Fisheries Resource Development
H antigen	Flagellar antigen
H	Haemagglutinin
HA	Haemagglutination activity
Ha	Hectare
HPAI	High pathogenic avian influenza
IAA	Integrated agriculture-aquaculture
ICMSF	international Commission on Microbiological Specifications for Foods
IFFS	Integrated fish farming systems
IVPI	intravenous pathogenicity index
K-antigens	Capsular polysaccharide antigens
LPAI	Low pathogenic avian influenza
LPAIVs	Low pathogenic avian influenza viruses
LPS	Lipopolysaccharide
LT	labile temperature
M	Meter
MPN	Most probable number

MSCRAMMs	Microbial surface components recognizing adhesive matrix molecules
N°	Nitrogen
N	Neuraminidase
ND	Newcastle Disease
NDV	Newcastle Disease virus
O antigen	Somatic antigen
OIE	Office International des Epizooties
P	Phosphorus
PCR	Polymerase chain reaction
PI	Post inoculation
Pls	Plasma-sensitive surface protein
Rpm	Round per minute
PVL	Panton-Valentine leukocidin
R.V	Rappaport Vassiliadis
<i>S.aureus</i>	<i>staphylococcus aureus</i>
SFD	Staphylococcus food-borne disease
SPFG	Sustainable Poultry Farming Group
SS agar	Salmonella Shigella agar
ST	stable temperature
TBE	Tris borate EDTA
TSI	Triple sugar iron
TSP	Triple superphosphate
US EPA	United States Environmental Protection Agency
UV	Ultra violet
Vi	Surface envelope
WA	Water activity
XLD Agar	Xylose-Lysine Deoxycholate Agar

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Introduction

Water fowls are belonging to the order Anseriformes, family Anatidae. It is not known exactly when ducks were domesticated but there is evidence that the ancient Egyptians used ducks for sacrifice (1353-1336 B.C.) and probably bred them for food (**Anonymous, 2011**).

Fish and poultry are one of the main protein sources for human feeding as poultry and fish meat contain high protein content and have an excellent source of water-soluble vitamins and minerals, such as iron and zinc (**Wolmarans, et al., 2010**).

Poultry-fish farming is the integration of poultry like chicken, ducks and geese with fish farming (**Tokrisna, 1995**) Which consider as an important way to enhance food security (**Prein and Ahmed 2000 and Kawarazuka 2010**).

Poultry litter has been used for fish feeding due to its higher nutrient contents (**Coleman and Edwards, 1987**). However, litter has often been demonstrated to increase fish yield beyond that expected from the addition of inorganic forms of nitrogen (N°) and phosphorus (P) alone (**Schroeder, 1978 and Noriega-Curtis, 1979**), but it contains fecal bacteria and viruses which contaminate the ponds and may has a bad effect on water fowls (**Edwards, 1993**).

The major members of pathogens that can be transmitted from litter to water are *Escherichia coli* (*E.coli*), Salmonella, and *staphylococcus aureus* (*S.aureus*). However, the pathogens discharged from the chicken and contaminate the litter, feed, water and thus the nearby birds (**Islam, et al., 2014**).

These pathogens have a great public health importance as Salmonellosis can cause substantial morbidity and also has a significant economic impact. Although most infections cause mild to moderate self-limited disease, serious infections leading to deaths (**De Jong and Ekdahl 2006**), *E.coli* can cause diarrhea primarily in children, particularly under poor hygienic conditions, as well as in animals (**Kaper, et al., 2004**), *S. aureus* is a major cause of food poisoning, due to the production of heat

resistant enterotoxins, which when consumed cause vomiting and diarrhea **international Commission on Microbiological Specifications for Foods (ICMSF) 1996)** and Influenza viruses are an important pathogens for humans and animals alike. In humans, influenza is a highly contagious respiratory disease which, in most cases, is self-limiting but nevertheless causes substantial morbidity and mortality worldwide. In the United States alone, there is an annual average of greater than 200,000 hospitalizations and 36,000 deaths due to complications from seasonal influenza **(Thompson, *et al.*, 2004)**. Also Newcastle disease virus (NDV) is a human pathogen and the most common sign of infection in humans is conjunctivitis that develops within 24 hours due to eye exposure to NDV **(Swayne and King, 2003)**.

Objective of the work

1-Surveying on some pathogens which present in poultry litter, fish ponds water and integrated ducks through isolation and identification of some pathogens which prevailed in each of litter obtained from poultry farms, water of fish ponds and its integrated water fowls by serological and molecular methods.

2- Study the Clinico-pathological effects of the isolated pathogens.