Original Research Article

Safety of Some Poultry Products against Avian Influenza Virus (AIV) and Newcastle Disease (ND) consumed within Erbil, Iraq

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ABSTRACT

Three different poultry products, Hubbard Broiler, Turkey and backyard sold within Erbil local markets have been tested for viral infection against highly pathogenic avian influenza (HPAI) and Newcastle disease (ND). An assay test device, Quacking AI virus antigen rapid test based on sandwich lateral flow immune-chromatophic sensitive assay was applied to detect the AI virus via visible T-band. The result indicated negative viral infection in all three poultry products consumed in there different parts of Erbil province: Darato, Tairawa, Qushtapa and Al-Shurta Quarter. It is concluded that the above procedure is reliable for routine survey against these diseases while further poultry products are recommended for general health check up for the safety of public consumption.

Keywords
Poultry; Avian Influenza (AVI); Newcastle disease (ND); Erbil, Iraq.

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Introduction

Due to general increase in the consumption of poultry products, the Avian Influenza (AI) has exerted an increased impact on the health of both animal and human. Avian Influenza virus (AIV) is a type-A Orthomyxovirus and produces a variety of disease syndromes in various poultry species (El-Sayed et al., 2011). Protection of both animal and human health from the direct spread consequences of AIV yet remains vitally a must via eradicating the disease in birds. Two poultry diseases considered sufficiently serious listed the Office International des Epizooties (OIE) are Highly Pathogenic Avian Influenza (HPAI) and Newcastle disease (ND) (Office International des Epizooties (OIE), 1996). The HPAI occurs relatively rarely, while ND is enzootic in some areas of the world and exerts a constant threat to most birds reared domestically (Alexander, 2000; Beard et al., 1984). Both diseases are amongst other important viral diseases of poultry do affect both domestic and wild birds worldwide.

Various techniques are implemented in diagnosing the micro-organisms specific to birds. The Para-myxoviruses isolates of avian species have been classified by serological test to nine serotypes designated i.e. APMV-1-APMV-9 and NDV has been
designated APMV-1 (Nwankiti et al., 2010; Gerlach, 1986). The APMV-1 strain is classified to three pathotypes based on virulence in chickens e.g. lentogenic, mesogenic and velogenic (Oluwole et al., 2012). The disease is characterized by respiratory symptoms such as coughing, gasping, sneezing, dropping wings, dragging legs, swelling of the tissues around the eye and neck, twisting of the neck, circling and cessation of egg production (Alexander, 2000). Human infection via exposure to infected birds can cause mild-conjunctivitis and influenza-like symptoms; and in severe cases, it can lead to some lasting impairment of vision (Nwankiti et al., 2010; Gerlach, 1986). While all AIV are members of the Orthomyxoviridae family the avian influenza (AI) is caused by, type-A strains of influenza virus. The latter are classified into different subtypes according to the antigenicity of their surface proteins, hemagglutinin (HA) and neuraminidase (NA) (Kawaoka et al., 1990; Rohm et al., 1996; Phan, 2010). The AIV in poultry are also classified on the basis of either highly pathogenic (HPAI) or low pathogenic (LPAI). The HPAI viruses are defined as those killing 75% or more of (4-8) weeks old chickens within ten days of inoculation. Only H5 and H7 subtypes viruses can cause HPAI, although not all viruses of these subtypes are virulent (Alexander, 2007). The LPAI viruses (kill less than 75% of {4-8} weeks old chickens within ten days of inoculation can include any of the 16 HA and 9 NA subtypes (Phan, 2010). Infection with AIV can be a devastating viral disease causing enormous losses in the poultry industry worldwide (Capua et al., 2009). Outbreaks of HPAI (H7N7) had led to 100% mortality in chickens and ducks within a few days in Netherlands during 2003 (Elbers et al., 2004). However, in both developed and in developing countries with their poor infrastructure, there were severe losses due to spread of the infection estimated by several billions of culled birds, and the disease become endemic in many infected countries. The estimated loss of the Egyptian poultry industry after the first emergence of highly pathogenic AI H5N1 in February 2006 was 1 billion US$ and affected the income of 1.5 million people whose livelihoods depended on poultry and about 30 million birds were culled or depopulated in Egypt in the first wave of 2006 (Meleigy, 2007). Conventional control strategies are based mainly on surveillance, stamping out of infected flocks, movement restriction, and enforcement of bio-security measures (Swayne, 2009). Vaccination as a supportive tool in AI virus control strategies was implemented to limit the spread of H5N1 and to reduce the losses (Lee and Suarez, 2005; EFSA, 2008; van den Berg et al., 2008). Its fetal risk may spread everywhere, particularly the consumer countries i.e. Iraq. The objective of this study has been to scan hundreds of three types of the imported poultry to Erbil city for public consumption against the infective viruses.

**Materials and Methods**

Only 300 adult of three different types of birds, Hubbard broiler, Turkeys and backyards were involved for rapid test. They were subdivided into four different districts within Erbil city Darato, Tayrawa, Qushtepe and Al-Shurta quarter for both NDV and AIV antigen (75 birds/district). The Quacking AIV antigen rapid test device
based on sandwich lateral flow immune-
chromatophic assay, has a testing window
with an invisible T (test) and C (control)
zones (Fig.1). When applied into the
samples hole on the device, the liquid will
laterally flow on the surface of the test strip.
Whenever, enough AIV antigen exist in the
sample, a visible T band will appear. The C
band should always appear after sample is
applied indicating a valid result.
Accordingly, the device can accurately
indicate the presence of AI virus antigen in
the sample. Similarly, the same procedure
and kit was used for Newcastle disease
antigen.

To collect the secretion off the birds the
swab sticks were inserted into bird’s cloaca
followed insertion them inside the assay
buffer tubes. Samples were agitated to
assure better sample extraction and then
taken out of the cassette from the foil pouch
and placed horizontally. Gradually, 3 drops
of sample extraction were dropped into the
sample hole “S” prior interpreting the result
in 5-10 minutes.

**Results and Discussion**

All the sensitive rapid tests showed negative
readings indicating no viral infection for
both NDV and AIV in broiler, Turkey and
backyard collected from four different
districts of Erbil city e.g. Darato, Tairawa,
Qushtapa and Al-Shurt Quarter (Table-1).
No symptoms of the infection in the animal
behavior were detectable to denote viral
infection.

The technique used in this work has
approved to be so sensitive in detecting a
subtle infection. Accordingly, it would be
recommendable for use in rapid virus
detection for general poultry surveys to
check the safety of animals against epidemic
viruses.

The increased importance that avian
influenza (AI) has gained in the fields of
animal and human health, related mainly to
the worldwide spread of the H5N1, the
highly pathogenic (HP) AI virus, has
highlighted the lack of information on many
aspects of the disease. Protection the health
of both animals and human from the direct
consequences of AI still remains a must
pending on eradication of the disease in
birds (Alexander, 2007).

Marketing poultry birds in the local
Kurdistan regions of Iraq always is carried
out between 45-55 days old for all birds.
Husbandry of chicks might be carried out in
either small farms or inside house e.g. as
domestic animals or pets. Possibility of viral
spread therefore becomes more likely in
such environment never mind the
transmission to humans. Health checkout
should be carried out regularly inside
breeder farms by specialist veterinary
doctors. Routine vaccination, will, therefore,
be carried out against certain epidemic
diseases to prevent spread and to protect the
poultry products. However, health check out
may be neglected by others via ignorance.
This may lead, unintentionally to an
outbreak of diseases elsewhere which may
infect other healthy birds around.
Accordingly, a rapid and an easy check out
procedures retains necessary for breeders to
preserve the health of their poultry products.
In our survey an attempt to survey the
presence of NDV and AIV in the a live
stock of Hubbard broiler, Turkey and live
backyard chicken after marketing in the
local market in Erbil city, was carried out by
picking random samples for a quick check
up after marketing. The results indicated
neither AIV nor NDV in the above three
districts of Erbil. This may be due to
successful vaccination programs applied in
the poultry farms and or pro-biotic that used
recently by farmers. Both direct and in direct
antiviral and the immune-stimulation effect in addition to dual use as a vaccine-vector and immune modulator are enough to prevent diseases (Sood et al., 2012). Field evidence has also shown that vaccination coupled with enhanced bio-security and monitoring measures could contribute to AI control (Capua et al., 2004; Capua et al., 2007).

**Table.1** The results of sensitive rapid test of cloacal samples for both NDV and AIV in Hubbard broiler, Turkey and backyard. (−) indicates negative (No infection detected).

<table>
<thead>
<tr>
<th>Districts/No. samples</th>
<th>Broiler (n=25)</th>
<th>Turkeys (n=25)</th>
<th>Backyard (n=25)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darato (n=75)</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Tairawa (n=75)</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Qushtapa (n=75)</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Al-Shurta Quarter (n=75)</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

**Fig.1** A schematic diagram to demonstrate the procedure used as the Quacking AI virus antigen rapid test device

Early survey for epidemic diseases of poultry helps in surveillance of and stops viral spread of any imported diseases to the country leading to limit the national economic losses. Accordingly, eradication of the diseases from local markets leads to public consumption safety. It would also prevent their transmission risk to human in causing conjunctivitis in human. Convenience of the methodology and accuracy to be applied as a routine quick survey in Veterinary labs for general health check out (Bio-security). It would be a first step to use any vaccination towards controlling such viral diseases from the country.

In such a quick rapid test the negative results might refer to the enhanced resistance of these birds in combating the virus and the consequence reduction of virus shedding, combined with bio-security and appropriate
surveillance, resulted in a rapid eradication of the outbreaks (Busani et al., 2007).

To the best of our knowledge, this study is the first attempt to survey two viral diseases in three different birds consumed within Erbil city. It would also assist in deciding whether or not and when vaccination becomes necessary to prevent spread the virus. This work could be extended to include other type of birds for the safety of public health and consumption.

References


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