Journal of Genetic and Environmental Resources Conservation, 2016, 4(2):158-161.
www.jgerc.com

Isolation of bacteria from birds in Baghdad

Maysoon S. Abbas
Zoonotic Disease Research Unit, College of Veterinary Medicine, University of Baghdad, Iraq.
maysoon.s.abbas@gmail.com

Abstract

This study carried out on isolation of bacteria from birds. A total of (100) samples of Rectal swabs from birds were randomly collected from Baghdad city (25) swap from pet birds, (70) swap from pigeon, (5) swap from chicken from Baghdad city. The result revealed that isolation rate was (63%) for *Staphylococcus aureus*,(66%) for *Streptococcus* group D, (49%) for *Escherichia coli,* (6%) for *E coliO157*, (11%) for *Salmonella* sp.,(18%) for *Shigella*,(14%) for *Vibrio* sp., (10%)for *Aeromonas* sp., (8%) for *Plesimonas shigelloides*, (30%) for *Klebsiella* sp., (2%)for *Nocardia* sp.

Keywords: Pathogenic bacteria, Isolation, Pet birds, Baghdad.

Introduction

Birds serving as sources of food and are vulnerable to pathogenic infection. Birds spread disease by contamination of food and water sources by diseased individuals (Gregory *et al.,* 2003; Cook *et al.,* 2003; Rappole *et al.,* 2006)

Wild birds acquire *Salmonellae* and *Escherichia coli* spread these microorganism directly or by contamination (Reed *et al.,* 2003; Samadpour *et al.,* 2002). Birds spreading salmonellosis, campylobacteriosis, mycobacteriosis, These bacteria cause disease in domestic animals including poultry (Reed *et al*., 2003) salmonellosis is a cause of sporadic mortality particularly young birds and song birds, wild birds (Daoust *et al.,* 2007) *Vibrio* sp. Including *V. cholerae* and *V. parahaemolytica* isolated from waterfowl (Cai *et al.,* 2001). Isolation of *Shigella* sp. (birds and rodents) cause zoonotic infection (Wong, 2010) animals including migrating birds transport of *V. cholerae.(*Edwards *et al*., 2010; Nair *et al*., 2007; Dobbs *et al*., 2013). *Salmonella*, *Shigella* and *Proteus*, multidrug-resistant enteric bacteri a isolated from different types of birds (Fillion *et al*., 2015)

Materials and Methods

Collection of samples: A total of 100 rectal swabs were collected from (100) birds (25) pet bird (sparrow), (70) pigeon, (5) from chicken free ranged Samples of birds were randomly collected from Baghdad city, samples transported to the Laboratory within hours and kept in the refrigerator at (4°C) cultures to bacteria were done within (2-4hrs) of samples collection. All swabs were then inoculated on blood agar, MacConkey agar, salmonella shigella agar, manitol salt agar, kanamycin agar, Thiosulfate citrate bile salts sucrose agar, and eosin methylene blue agar, chrom agar. Suspected pathogens were further identified by growth characters morphology of colony, direct macroscobic examination, motility test, and different biochemical tests (Quinn *et al.,* 2006).

Results and Discussion

The result revealed that isolation rate was (63%) for Staphylococcus aureus, (66%) for Streptococcus group D, (49%) for Escherichia coli, (6%) for E. coli O157, (11%) for Salmonella sp. ,(18%) for Shigella, (14%) for Vibrio sp., (10%) for Aeromonas sp. (8%) for Plesimonas shigelloides, (30%) for Klebsiella sp., (2%) for Nocardia sp. (Table 1).

In this study different Bacteria of human importance were isolated the infected bird shed the agent,for prolonged period and the shedding of a pathogen is more obvious in younger birds than in adult as in Salmonellosis. ((Aly *et al*., 2015) *E. coli, Salmonellae* isolated in the rate of 48 % and 10.75% wild birds as true reservoirs in transmission of *E. coli* and salmonellae. The bacteria isolated from different sp. of birds were *Salmonella* sp. (46.67%), *E. coli* (64.44%), *Staphylococcus* sp. (46.67%), *Proteus* sp. (6.67%) (*Pasteurella* sp. (33.33%) (Nnachi *et al*., 2015).

Table (1): Isolation rate and percentage of bacteria from birds in Baghdad

Type of bacteria	Total no.	No of positive in chicken(5)	No of positive in Pet bird(25)	No of positive in pigeon(70)
Staphylococcus aureus	63	5	15	43
Streptococcus group D,	66	4	20	42
Escherichia coli	49	4	13	32
Klebsiella sp.	30	3	11	16
Shigella	18	2	12	4
Salmonella sp.	11	5	3	3
Aeromonas sp.	10	1	1	8
Vibrio sp.	14	1	3	10
Nocardia sp.	2	-	-	2
E coliO157	6	1	1	4
Plesimonas shigelloides	8	-	2	6

Bacteria isolated from 72 samples collected from water birds in Bangladesh. Isolation rate of *Staphylococcus* sp. 27.78%, *E. coli* was 54.16 % *Salmonella* sp. 31.94%, *Proteus* sp. *Bacillus* sp. 26.38 % 8.33%. Among the isolates, *E coli* was found to be most prevalent bacteria. (Vezzulli *et al.,* 2010).fresh feces from 343 migratory aquatic birds, were collected in Chiba and Ibaragi Prefectures, Japan, from 103 (30.0%) of the 343 samples. Among those positive samples, *Vibrio cholerae* (15.7%), *V. parahaemolyticus* (8.5%).

Salmonella species were isolated from captive passerine or psittacine birds, was reported in different cases (Kullas *et al*., 2002). Wild and migratory birds spread bacterial diseases that affect public health through migration routes. (Wani *et al*., 2004). birds and animals feces may contain pathogens that are infectious for different species of animals ,plants, humans. The main types of pathogens in collecting and processing of organic wastes and feces, and hygienic risks due to sludge and related products. (Sonntag *et al*., 2005).

Wild birds play an important role in the dissemination of pathogenic organisms, *Mycobacterium avium*, *Chlamydia psittaci, Campylobacter jejuni, Borrelia burgdorferi*, *Salmonella* sp., *Escherichia coli*, (O157-H7) (Ejidokun *et al*., 2006; Jubirt *et al*., 2015; Wong, 2010; Praveen *et al*., 2014; Gowda *et al*., 2015). *Salmonella* genus colonize the digestive tract of birds, Salmonellosis causes gastroenteritis in humans and animal, being the most important reported zoonotic disease bacterial food-borne disease in industrialized countries (Ahmed *et al*., 2011; Akhter *et al*., 2010). *Salmonella* spp and *E. coli* of human isolated from migrating birds are important in transmission pathogens by migrating birds and the handling of birds by workers (Sarker *et al*., 2012). *Staphylococcus aureus* is the bacteria involved in food poisoning causing gastroenteritis from ingestion of enterotoxins in contaminated food (Roppole *et al*., 2003). *Escherichia coli* is the most common foodborne zoonotic pathogen causing various disease in both animals and humans (Tsiodras *et al*., 2008). *E. coli* O157 isolated from faeces of garden bird in southwest Scotland, this indicate that both birds and people is a priority during ringing exercises and during garden-bird feeding (Martens *et al*., 2003; Reed *et al*., 2003). Faeces of Rook *Corvus frugilegus* were the source of *E. coli* O157 infection in humans which handled. (32) *Campylobacter* sp., *Vibrio* sp., *Salmonella* isolated in 105 of 338 (31%) fecal sample, (101) *Klebsiella* species isolated from duck cloaca from Igoli (Huba´lek, 2004; Humair, 2002). *E. coli* O157, that causes enterohaemorrhagic infections in humans and have been recovered from wild birds (Ejidokun *et al*., 2006; Hilbert *et al*., 2012). *Aeromonas hydrophila* ubiquitous in freshwater and infects fish, humans, reptiles, and birds (Tizard, 2014) Isolation of *Shigella* sp. from birds can be vectors for *Shigella* sp. and cause zoonotic infection (Ves *et al*., 2003). *Aeromonas* sp. have an pathogen, isolates from chicken, including *Aeromonas hydrophila*, *Aeromonas sobria, Aeromonas caviae*.(Kumar *et al*., 2014; Foster *et al*., 2006). From 226 fecal sample, intestinal content, rectal swab, and heart blood were collected from animals and birds, all the samples were tested for isolation of *E. coli*. Out of all the samples 138 (61.06%)were found to be positive for *E. coli* (Neher *et al*., 2016).

References

Ahmed, L.M.; Al-Obaidi, F.A. and Al- Shadeedi, S.M. 2011.Prevalence of some zoonotic bacteria in wild birds in Kirkuk city, Al-Anbar.J. Vet. Sci., 4: 11-17.

Akhter, M.T.; Hossain, M.T.; Siddique, M.P. and

Islam M.A. 2010. Isolation and identification of microflora from apparently healthy caged parrots of dhaka zoo of Bangladesh, Bangl. J. Vet. Med., 8(1):5-10.

Aly, E.A. and Shobrak, M.Y. 2015. Isolation and molecular characterization of multidrug-resistant *Salmonella, Shigella* and *Proteus* from domestic birds, Thailand J. Vet. Med., 45(1): 23-34.

Cai, T.; Pace, J.L.; Pierson, M.D. and Gorham, J.R. 2001.Foodborne Disease Handbook, 407-438.

Cook, M.I.; Beissinger, S.R.; Toranzos, G.A.; Rodriguez, R.A. and Arendt, W.J. 2003. Trans-shell infection by pathogenic microorganisms reduces the shelf life of non-incubated bird's eggs: a constraint on the onset of incubation? Proceedings of the Royal Society B: Biological Sciences, 270: 2233–2240.

Daoust, P.Y. and Prescott J.F. 2007. Salmonellosis. In: Thomas, N.J.; Hunter, D.B. and Atkinson, C.T. ed. Infectious diseases of wild birds, Blackwell, Ames, Iowa, 270-288pp.

Dobbs, F.C.; Goodrich, A.L.; Thomson, F.K. and Hynes, W. 2013. Pandemic serotypes of *Vibrio cholerae* isolated from ship's tanks and coastal waters: assessment of antibiotic resistance and virulencegenes (tcpA and ctxA). Microb. Ecol., 65: 969–974.

Edwards, P.R. and Hull, F.E. 2010. Haemolytic streptococci in chronic peritonitis and salpingitis of hens. J. American Vet. Med. Assoc., 44: 656-660.

Ejidokun, O.O.; Walsh, A.; Barnett, J.; Hope, Y.; Ellis, S.; Sharp, M.W.; Paiba, G.A.; Logan, M.; Willshaw, G.A.; and Cheasty, T. 2006. Human Vero cytotoxigenic *Escherichia coli* (VTEC) O157 infection linkedto birds. Epidemiol. Infec., 13: 421–423.

Fillion K. and Mileno M.D. 2015. Cholera in travelers: shifting tides in epidemiology, management, and prevention. Curr. Infect. Dis. Rep., 17: 455.

Foster, G.; Evans, J.; Knight, H.I.; Smith, A.W.; Gunn, G.J.; Allison, L.J.; Synge, B.A. and Pennycott, T.W. 2006 . Analysis of feces samples collected from a wild-bird garden feeding station in Scotland for the presence of verocytotoxin-producing *Escherichia coli* O157. Appl. Environ. Microbiol., 72: 2265–2267.

Gowda, T.K.; Reddy, V.R. and Devlees S.B. 2015. Isolation and seroprevalence of *Aeromonas* sp. among common food animals slaughtered in Nagpur, Central India. Foodborne Pathog. Dis., 12(7): 626-630.

Gregory, R.D.; Noble, D.; Field, R.; Marchant, J.; Raven, M. and Gibbons, D.W. 2003. Using birds as indicators of biodiversity. Ornis. Hungarica, 13: 11–24.

Hilbert, F.J.M.; Smulders, R.; Chopra-Dewasthaly, and Paulsen, P. Paulsen, 2012. *Salmonella* in the wildlife-human interface. Food Res. Int., 45(2): 603–608.

Huba´lek, Z. 2004. An annotated checklist of pathogenic microorganisms associated with migratory birds. J. Wildlife Dis., 40: 639-659.

Humair, P.F. 2002. Birds and *Borrelia*. Int. J. Med. Microbiol., 33: 70-74.

Jubirt, M.M.; Hanson, L.A.; Hanson-Dorr, K.C.; Ford, L.; Lemmons, S.; Fioranelli, P. and Cunningham, F.L. 2015. Potential for great egrets (*Ardea alba*) to transmit a virulent strain of *Aeromonas hydrophila* among channelcatfish (*Ictalurus punctatus*) culture ponds. J. Wildlife Dis., 51(3): 634-639.

Kullas, H.; Coles, M.; Rhyan, J. and Clark, L. 2002. Prevalence of *Escherichia coli* serogroups and human virulence factors in feces of urban Canada geese (*Branta canadensis*). Int. J. Environ. Health Res., 12: 153–162.

Kumar, A.; Taneja, N.; Bharti, B. and Sharma, M. 2014. Characterization of Shiga toxigenic *Escherichia coli* isolated from cases of diarrhoea and haemolytic uremic syndrome in North India. Indian J. Med. Res., 140: 778-784.

Martens, W. and Bohm, R. 2002. Public health aspects connected to the use of sludge on land. AMIRAN 2002.10 th International Conference. Hygiene Safety Proceedings. Štrbské Pleso, High Tatras, (Slovak Republic) May 14-18.

Nair, G.B.; Ramamurthy T.; Bhattacharya, S.K.; Dutta, B.; Takeda Y. and Sack D.A. 2007. Global dissemination of *Vibrio parahaemolyticus* serotype O3:K6 and its serovariants. Clin. Microbiol. Rev., 20: 39–48.

Neher, A.K.; Hazarika, L.M.; Barkalita, P.; Borah, D.P. and Sharma, R.K.K. 2016. Isolation and characterization of Shiga oxigenic*Escherichia coli* of animal and bird origin by multiplex polymerase chainreaction. Vet. World, 9(2): 123-127.

Nnachi, A.U.; Egbo, L.U.; Afiukwa, F.N.; Ukaegbu, C.O.; Udu-Ibiam, O.E.; Okoroafor, I.; Igwe, C.C. and Daniel, L.E. 2015. *Klebsiella*species isolated from duck cloaca. Sch. Acad. J. Biosci., (2B): 207-213.

Praveen, P.K.; Debnath, C.; Pramanik, A.K.; Shekhar, S. and Dalai, N. 2014. Incidence and biochemical characterization of *Aeromonas* species isolated from retail fish and chicken in

North Kolkata region. J. Cell Tissue Res., 14(3): 4609-4612.

Quinn, P.J.; Markey, B.K.; Carter, M.E.; Donnally, W.J.C. and Leonard, F.C. 2006. Veterinary Microbiology and Microbial Disease. TJ International LTD Pads tow, Cornwall, Great Britain, 97-105pp.

Roppole, J.H. and Hubalek, Z. 2003. Migratory birds and West Nile virus J. Appl. Microiol., 94: 475-585.

Reed, K.D.; Meece, R.K. and Henkel, J.S. 2003. Birds from migration and emerging zoonoses: West Nile virus, Lyme disease, Influenza A and enteropathogens. Clinc. Med. Res., 1: 5-12.

Samadpour, M.J.; Stewart, K.; Steingart, C.; Addy Ismailia J.; Louderback, M.; Mc Ginn, J. E. and Newman, T. 2002. Laboratory investigation of an *E. coli* O157:H7 outbreak associated with swimming in Battle Ground Lake, Vancouver, Washington. J. Environ. Health, 64: 16-20.

Sarker, M.; Jahan, M.N.; Parvin, M.A.; Malek, H. and Hossain, M.T. 2012. identification of bacterial flora isolated from apparently healthy water birds of dhaka zoo of bangladesh, Bangladsh J. Vet. Med., 1(1&2): 21-26.

Sonntag, A.K.; Zenner, E.; Karch, H. and Ielaszewska, M. 2005. Pigeons as a possible reservoir of shiga toxin 2f-producing *Escherichia coli*pathogenic to humans. Berliner und Münchener tier rztliche Wochenschrift, 118: 464–470.

Tizard I. 2004. Salmonellosis in wild birds. Seminars in Avian and Exotic Pet Medicine, 13: 50–66.

Tsiodras, S.T.; Kelesidis, L. Kelesidis, U. Bauchinger and Falagas, M.E. 2008. Human infections associated with wild birds. J. Infect., 56: 83-98.

Ves Florence, B. and Michel, G. 2003 *Staphylococcus aureus* and food poisoning. Gen. Mol. Res., 1: 63-76.

Vezzulli L.; Previati C.; Pruzzo C.; Marchese A.; Bourne D.G. and Cerrano, C. 2010. *Vibrio* infections triggering mass mortality events in a warming Mediterranean Sea. Environ. Microbiol., 12: 2007–2019.

Wani, S.A.; Samanta, I.; Bhat, M.A. and Nishikawa, Y. 2004. Investigation of shiga toxin-producing *Escherichia coli* in avian species in India. Lett. Appl. Microbiol., 39: 389–394.

Wong, N.K. 2010. Identification and detection of shigella species from wildlife using multiplex polymerase chain reaction (mPCR), A thesis of Bachelor of Science with Honors, Faculty of Resource Science and Technology University Malaysia Sarawak.

.