

## Aeromonas Hydrophila Infection: A Review

Mona S. Zaki<sup>1</sup>, Nagwa S. Rabie<sup>2</sup> and Kh. M. Elbayoumi<sup>2</sup>

<sup>1</sup>Hydrobiology Department, National Research Centre, Dokki, Giza, Egypt

<sup>2</sup>Department of Poultry Diseases, National Research Centre, Dokki, Giza, Egypt

**Abstract:** The *Aeromonas hydrophila* (*A. hydrophila*) bacterium is found in all freshwater environments, in brackish water and in chlorinated and unchlorinated drinking water. *Aeromonas* spp. Was considered as potential food-borne psychrotrophic pathogens. It is recognized to cause a variety of diseases in fish, poultry and transmitted to human being causes clinical disease. Fish and chicken play an important role in the transmission of this pathogen to humans. *A. hydrophila* is aquatic pathogen can grow competitively at 5°C. Gram-negative, Oxidase positive, facultative anaerobic, opportunistic. *A. hydrophila* able to produce virulence factors, such as hemolysins, adhesions, enterotoxins, phospholipase, lipase and aerolysins, the latest is a virulence factor contributing to the pathogenesis of *Aeromonas hydrophila* infection. *A. hydrophila* was isolated from fish meat, milk and dairy product together with chicken showing clinical disease. B-lactamase producing strains of *A. hydrophila* was isolated from many clinical cases due to hazzard use of antibiotics in fish and human being.

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### Disease in different species

*Aeromonas hydrophila* is a zoonotic bacterial disease incriminated to cause many of disease condition in fish, chickens and human (**Mailafia et al., 2008**). It is indisputable that *Aeromonas* strains may produce many different putative virulence factors such as enterotoxins, hemolysins or cytotoxins, and antibiotic resistance against different antibiotics. It is a gram negative facultative microorganism widely distributed in fresh and brackish water (**Abraham, 2011**).

In fish *A. hydrophila* is considered as one of the most important aquatic pathogens and usually infects different fish species causing severe pathological lesions including degenerative changes in hepatic and renal tissues with necrosis in severe infections together with ulcerative dermatitis, tail rot, fin rot and hemorrhagic septicemia, the disease has public health importance as it could be transmitted to human through water contamination or ingestion of contaminated fish causing variety of gastrointestinal and extra intestinal symptoms include fever, chilling, abdominal pain, nausea, vomiting and diarrhea (**Zaur and Aziz, 1994** **Igbinosa et al., 2012** and **Ansari, et al., 2011**).

*Aeromonas hydrophila* was isolated from chicken meat (**Dallal et al., 2012**), and from organs of clinically sick commercial chickens not from apparently healthy chicks (**Dashe et al., 2014**). Experimental infection of chickens with  $1.5 \times 10^9$

organisms via subcutaneous and yolk sac results in death of all experimental birds within 24 hours, dead birds show congestion in the internal organs with petechial hemorrhage on liver and muscles in few cases, on the other hand mortalities decreased when infectious dose decreased to  $3.5 \times 10^7$  organisms (**Mahmoud and Tanios, 2008**). *Aeromonas* spp. could be isolated from processed raw chicken for their biochemical characteristics, ability to produce exotoxins and to grow at chill temperatures. (**Kirove, et al., 1990**)

### Isolation and identification

Isolation of clinical cases was fulfilled on Blood agar and MacConkey agar. The cultures were then incubated aerobically at 37°C for 24 h. Oropharyngeal swabs were cultured indirectly by first inoculating each sample into 5ml of brain heart infusion broth (BHI), followed by incubation of the broth mixture at 37°C for 24 h and then streaking loop samples of the broth culture into media such as Blood and MacConkey agar. Cultural and morphological examinations were conducted as described by **Barrow and Feltham, (2004)**. Suspected colonies further identified by biochemical tests, biochemical tests used for the identification of the presumptive isolates of *Aeromonas hydrophila* were urease, Simmons citrate, nitrate, indole, motility, methyl, Voges Proskauer and catalase, moreover All

*Aeromonashydrophila* isolates identified by the biochemical test reactions were further subjected to additional analytical profile test using OxoidTMMicrobact GNB 24E kit (a commercially available biochemical test kit in microplate format for identifying Enterobacteriaceae and miscellaneous Gram negative bacilli) (**Dashe et al., 2014**).

#### Virulence factors

Virulence factors include enter toxins, hemolysins or cytotoxins together with antibiotic resistance against different antibiotics (**Ansari et al., 2011 and Praveen et al., 2014a**).

#### Antibiotic sensitivity

Most strains of *A. hydrophila* were sensitive to chloramphenicol, ciprofloxacin and norfloxacin followed by gentamicin and neomycin while nalidixic acid, tetracycline, streptomycin and trimethoprim sulphamethoxazole had moderate effect. On the other hand, all *A. hydrophila* strains were resistant to amoxicillin, cephalothin, erythromycin and penicillin G. (**Mahmoud and Tanios, 2008**), In spite of rare resistance development for *Aeromonashydrophila* quinolone group antibiotic (**Aravena-Roman et al., 2012**), increase antibiotic resistance against *Aeromonas hydrophila* was reported against many antibiotic classes this indirectly affect human health and generate hazards public health (**Daood, 2012**), this may be due to unnecessary increase use of antimicrobial agents in fish and human being (**Adebayo et al., 2012**) resulting in emergence of  $\beta$ -lactamase producing *A. hydrophila* (*Aeromonas hydrophila*) strain (**Chen et al., 2012**).

#### Control

The disease controlled by application of strict hygienic measures to avoid infection of susceptible species or transmission from fish to human or chickens due to zoonotic importance together with use antibiotic efficient against *Aeromonas hydrophila* in clinical diseased birds (**Praveen et al., 2016**).

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