Is *Aeromonas hydrophila* a potential pathogen of food safety concern?

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Editorial

Microbial food safety is growing public health issue, which is confronting the industrialized as well as developing nations of the world. Food safety gives assurance that food will not cause any harm to the consumer when it is prepared and/or eaten [1]. There are several organisms, such as *Listeria monocytogenese*, *Aeromonas hydrophila*, *Yersinia enterocolitica*, *Campylobacter jejuni*, *Escherichia coli* 0157: H7, *Plesiomonas shigelloides*, *Vibrio parahaemolyticus*, and *Bacillus cereus*, which are considered important from food safety point of view [1,2]. *Aeromonas hydrophila* is an aquatic organism of medical important that was originally isolated from frogs, in which it produces the red leg disease. The disease aeromoniasis is caused by *A. hydrophila*, *A. caviae*, and *A. sobria*. Among these, *A. hydrophila* is an emerging foodborne bacterial zoonotic pathogen, which has been reported from many countries of the world including India. It can cause disease in immunocompetent as well as immnocompromised persons. The causative agent is facultative anaerobe, Gram negative, heterotrophic, polar flagellated, straight rod, coccoid or rod shaped, oxidase positive, and indole positive [3,4]. *Aeromonas hydrophila* is widely distributed in fresh water, salt water, water supplies, sludge, sewage, and fish tank. The organism is susceptible to chlorine, but resistance to cold temperature and common antibiotics, such as penicillin, ampicillin, and colistin. It has a wide temperature range as it can grow from -2 to 45ºC. A number of factors, such as enterotoxins, hemolysin, amylase, aerolysin, gelatinase, lipase, and chitinase are believed to be attributed in the pathogenesis of *A. hydrophila* [5,6]. One study indicated that over 50% of the raw milk samples were contaminated with *A. hydrophila* [7]. The multiplication of organism probably occurs during storage in refrigerated bulk tanks. *Aeromonas hydrophila* is a psychrotophic bacterium, and therefore, it grows well in foods during refrigeration [8]. The author has isolated *A. hydrophila* from water, fish, meat, poultry, and milk. It is mentioned that fish, water, milk, ice cream, meat, vegetables, and sea foods are incriminated in *A. hydrophila* infections. Many workers from different countries have described the involvement of *A. hydrophila* with diarrhea particularly in children of developing nations. The disease can occur in sporadic as well as in epidemic form. An outbreak of *A. hydrophila* occurred in China in 1993 in which 82 persons were affected, and the source of infection was drinking water, which was contaminated with sewage. A recent massive foodborne outbreak of *A. hydrophila* involving more than 200 college students was reported from China during 2012. The students developed acute diarrhea, abdominal pain, headache, vomiting, and fever. The epidemiological investigation implicated cold salad as the vehicle of transmission in this outbreak. The vegetables used to prepare salad were washed in polluted water from a tank located near to sewage pit [4]. Humans can acquire the infection by ingestion of contaminated fish, sea foods, raw milk, raw meat, raw vegetables, and water contaminated with *A. hydrophila*. Infection can also occur through open wound contamination [3]. Drinking of contaminated water and consumption of contaminated foods are important risk factors, which predispose the individuals to *A. hydrophila* infections. Swimming in contaminated water can also pose a risk to infection. The incubation period of disease is usually 24 to 48 hours. The affected person exhibits gastrointestinal symptoms, such as abdominal pain, nausea, vomiting, and diarrhea. In addition, localized wound infections, which include cellulitis, myonecrosis, necrotic fascilitis, and erythema gangrenosum are also noticed [3]. In few patients, extra-intestinal infections, such as otitis, peritonitis, meningitis, ocular and urinary tract disorders may occur. The infection is severe in immunocompromised patients who are suffering from carcinoma, leukemia, and HIV/AIDS. The diagnosis should be confirmed by isolation of *A. hydrophila* from clinical specimens mainly the stool on microbial media, such as ampicillin dextrin agar, Pyan's medium and starch ampicillin agar [3]. It is advised that trypticase soy broth with ampicillin should be used for enrichment of the organism. Currently, molecular tools are employed for diagnosing *A. hydrophila* infection. Ampicillin dextrin agar was employed for the recovery of *A. hydrophia* from the stool of a man who developed diarrhea following consumption of contaminated fish [3]. Membrane filtration technique has been employed for the isolation of *A. hydrophila* from the drinking water [9]. The bacterium should be differentiated from *Plesiomonas shigelloides*, *Vibrio cholera*, *V. parahaemolyicus* and *V. vulnificus* by employing standard microbiological techniques. *Aeromonas hydrophila* is susceptible to a plethora of antibiotics like ceftriaxone, cefuroxine, cephotoxamine, chroramphenicol, ciprofloxacin, enrofloxacin, gentamycin, kanamycin, nalidix acid, and ofloxacin. Any of these antibacterial antibiotics can be used to treat the patients. However, there are evidences to believe that in clinical practice, the patients are usually treated with ciprofloxacin and enrofloxacin with encouraging results [3]. Heat treatment of foods, pasteurization of milk, chlorination of water, use of clean water for washing vegetables, keeping the foods in cold chain before consumption, maintenance of good hygiene in food processing plants keeping raw and processed food separately, and surveillance of food and water can certainly reduce the risk of foodborne aeromoniasis. The persons with open wound are advised not to handle the contaminated fish or swim in contaminated water [3]. Sincere efforts should be made to educate the food handlers, food preparers, and consumers about the principles of food hygiene. It is emphasized that all food

establishments should implement the good hygienic practice, good manufacturing practice, and hazard analysis critical control point from food safety point of view. As *Ahydrophila hydrophila* is a psychrotoph (cold loving organism), its growing role an important pathogen in the safety of various foods needs to be further investigated.

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