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Detection of *Aeromonas* spp. associated with hemorrhagic septicemia in fish lakes in Al-Sawuira city, Iraq

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Abstract
Hemorrhagic Septicemia is one of the most important contagious bacterial diseases of fish. The current study amid to detection of *Aeromonas* spp. associated with Hemorrhagic Septicemia in fish lakes in Al-Sawuira City, Iraq for this purpose, 120 samples were collected from fish suffering from Hemorrhagic Septicemia. Bacterial isolation and identification were done then the results were confirmed by by VITEK II system. The results showed that *A. hydrophila* isolated in a rate of 88.3% and *A. sobria* isolated in a rate of 22.5%.

Keywords: Fish, hemorrhagic septicemia, *Aero monas* spp.

Introduction
Fish are a source of national income and a major source of protein. Fish breeders try to maximize their profits by reducing costs and increasing production. This intensive breeding has led to an increased risk of contracting various diseases [1]. Hemorrhagic Septicemia is one of the most important contagious bacterial diseases of fish which is characterized by rapidly fatal septicemia, abdominal edema, ulcer formation, and exophthalmia. it's also called infection abdominal dropsy [2].
Hemorrhagic Septicemia infects many fish species such as catfish, goldfish, snakehead fish, rainbow trout, brown trout and tilapia but most fish types sensitive types are Cyprinidae and common carp [3].
The main predisposing factors for *Aeromonas* hemorrhagic septicemia are: Overcrowding, high temperature, malnutrition, reduction of oxygen, high ammonia and nitrite levels also the injures caused by rough handling or skin parasites are considered as one of most important predisposing factors [4]. Hemorrhagic septicemia caused by bacteria belong to genus Aeromonus, which are gram negative bacteria, bacilli or coccobacilli in from, aerobic or anaerobic, non-spore forming, motile by pallor flagella, these bacteria produce many toxin such as leucocidrin, cytotoxin, enterotoxin, hemolysin and nectotizing toxin [5]. The causative agent is transmitted horizontally by contaminated water and
Pond sediments with bacteria or intestinal secretions from infected fish vectors also play an important role in transmission [6].
Hemorrhagic septicemia takes tow forms, Acute form which characterized by a rapidly fatal septicemia (mortality rate is 80-90) with an accumulation of the fluid in the scales pockets and the abdominal cavity exophthalmia and reddish skin. Other forms called Chronic form (mortality rate 30-40%) which is characterized by ulcerative form in the skin, focal hemorrhages Both dermis, rot of tail and fin [7].
This study aimed to detection of *Aeromonas* spp. associated with Hemorrhagic Septicemia in fish lakes in Al-Sawuira City, Iraq

Materials and Methods
The study conducted on 4 lakes with high fish mortality rate in Al-Sawuira city in period from April to July 2023. 120 live fish suffering from necrosis of gills and internal viscera lesions were taken (figure 1).

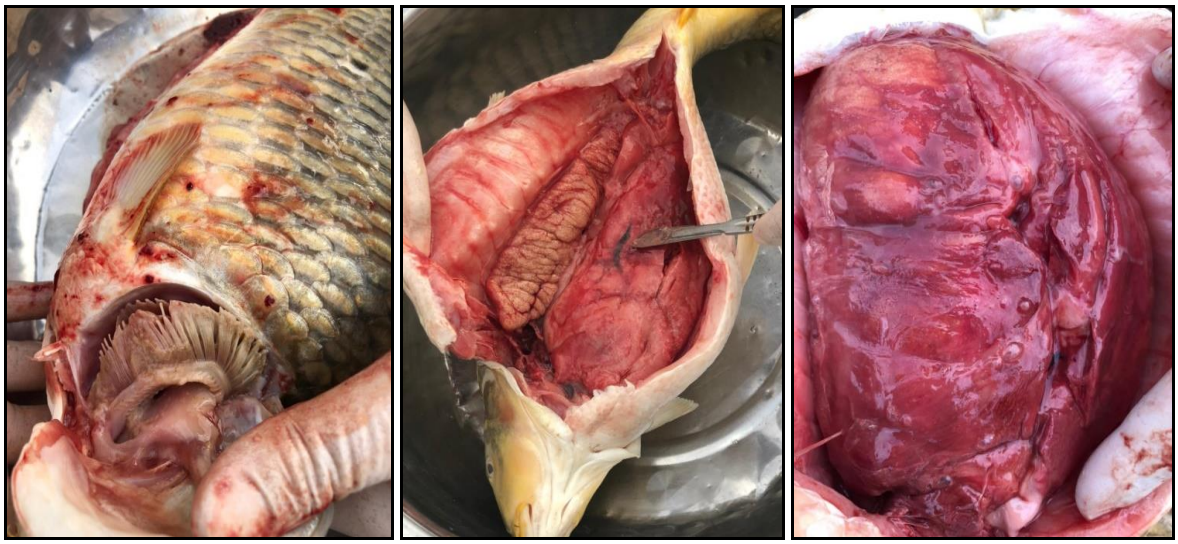

Fig 1: A- Gray gills, B- Internal viscera lesions, C- Spleen.

Swabs were taken from lesion then cultivation on Tryptic Soya Agar, MacConky agar and blood agar aerobically at 37C for 48h then groups of biochemical tests were conducted. After that the diagnostic were confirmed by VITEK II system [8].

Results and Discussion

In current study two types of *Aeromonas* were isolated which are *A. hydrophila and A. sobria*, the isolate were lactose fermented with big colony (figure 2). All isolated were positive to oxidase, catalase, indole, VP, nitrate reduction, fermented maltose, galactose, arabinose and Sucrose fermentation.

Fig 2: Colony of *Aeromonas* spp. On MacConky agar

All so the current study showed that the *A. hydrophila* is dominance spp. Of *Aeromonas* (according to results of VITEK II system) as in table 1.

Table 1: Results of *Aeromonas* spp. Isolated from 120 fish samples

Sample: isolates	*Aeromonas* spp.	
	A. hydrophila	***A. sobria***
Number of isolates	106	27
Isolation ratio	88.3%	22.5%

The results of current study agreed with results of Yu *et al*., 2015 whom showed that many species *Aeromonas* that infected fish are *A. hydrophila*, *A. caviae*, *A. sobria*, *A. salmonicida*, *A. veronii*, *A. jandaei*, *A. bestiarum* [9].

Study of Austin and Austin, 1993 showed that A. hydrophila is main species that caused of Hemorrhagic edema, infectious dropsy, and fin and tail rot in freshwater fish [10]. In a study conducted in Iran on Manshadi & Assareh fish (2014) found that's 100% of the isolated samples identified *Aeromonas* hydrophila as the causative agent while Pseudomonas aeruginosa, 21.05% and fluorescens, 31.57%. Pseudomonas putida was unknown and represented 10.25% of the isolates. [11].

In a study of Kayis *et al.* (2013) on goldfish showed *Aeromonas* hydrophila isolated from the surface of the body and fins of goldfish with bleeding in the skin and fins [12].

Aeromonas hydrophila has Protein outer layer, A protein layer which are very similar to fimbriae, protect *Aeromonas* and provide a mechanism for its adhesion and entry into macrophages, also Bacterial proteases are exotoxins secreted by *Aeromonas* bacteria which hydrolysis of RBCs, WBCs many other cells destroy fish tissues, and also secrete exotoxins [13].

Conclusion

Aeromonas spp is main bacterial causes Hemorrhagic Septicemia and *A. hydrophila* is dominance specie

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