

The use of antibiotics can result in drug-resistant strains of diseases, causing bacteria that can harm aquatic animal populations and consumers of aquaculture fish. There are also increasing concerns about foodborne hazards, such as chemicals and microbial contaminants, that might be present in fish. These concerns can also result in decreasing demand for farmed fish (Smallwood and Blaylock, 1991). In an approach to satisfy the growing demand for fish, food safety is a major factor to be considered since these animals can be routes for the transmission of various pathogens such as *Salmonella* spp., *Vibrio* spp., *Aeromonas* spp., *Campylobacter* spp., *Shigella* spp., *Yersinia* spp., *Clostridium* spp., *Bacillus cereus*, *Escherichia coli*, *Listeria monocytogenes*, *Staphylococcus aureus*, and *Plesiomonas shigelloides* which have been responsible for numerous cases and outbreaks of food-borne diseases in humans worldwide (Cortes-Sanchez et al., 2021).

*Plesiomonas shigelloides* is an oxidase-positive, facultatively anaerobic, Gram-negative, motile, rod-shaped bacterium commonly found in aquatic environments (Jagger, 2010; Janda et al., 2016). Aquaculture-raised fish for commercial purposes appear to be strongly associated with the presence of *P. shigelloides* (Janda et al., 2016). *Plesiomonas* was a common pathogen in the gills, muscles and intestines of fish as well as in rearing waters and pond sediment (Pakingking et al., 2015). Many works of literature reported that *Plesiomonas shigelloides* caused diarrhoea/gastroenteritis in humans via water or fish contaminated with this pathogen (Gonzalez - Rey et al., 2000). *Plesiomonads* are mesophiles with growth temperatures ranging between 8 °C~45 °C with (a) pH ranging between 4.5 and 9.0 (Janda et al., 2016). Several factors that encourage the growth of *Plesiomonas shigelloides* include(s) overcrowding, oxygen levels, temperature, and climatic conditions, as well as food sources (Jun et al., 2011). However, little or no information is documented on *Plesiomonas shigelloides* as a causal agent of enteritis in pond water and African catfish (*C. gariepinus*). Hence, this study aimed at evaluating the microbial loads, isolation and antimicrobial susceptibility of *Plesiomonas shigelloides* from experimental pond water and *C. gariepinus*.

## 2 Materials and Methods

### 2.1 Study area

This study was conducted at the Department of Fisheries and Aquaculture Technology's Teaching and Research Farm, Olusegun Agagu University of Science and Technology, Okitipupa. Okitipupa is located in the Ondo State of Nigeria, and it is reported to have a geographical coordinate of 6° 27' 25" N, 4° 46' 00" E.

### 2.2 Media preparation and sterilization of materials

All media (Inositol brilliant green agar, nutrient agar, Mueller Hinton agar, nutrient broth, blood agar and alkaline peptone water) were prepared according to the manufacturer's instruction; the media were weighed out accurately and dissolved in an appropriate volume of water. The prepared mixture was homogenized and sterilized by autoclaving at 121 °C for 15 min. All these media were allowed to cool after sterilization to about 45 °C before pouring into Petri dishes. Alkaline peptone water was used as an enrichment medium.

### 2.3 Sample collection and design

Experimental ponds (6) were randomly selected and used for this study. The experimental ponds were replicated twice and the pond water (aquaculture water) was collected from each experimental pond at 0, 2, 4, 6 and 8 weeks while fish tissues (gill, liver and intestine) were collected from each experimental pond at 0, 4 and 8 weeks. Three fish were sampled from each experimental pond every 4 weeks. The experimental design was completely randomized block design.

### 2.4 Water quality analysis

A water sample (50 mL) was taken at 25 cm below the water surface by using a Van Dom water sampler (Denmark) from each experimental pond. The water quality parameters such as pH, temperature and total dissolved solids were taken at 0, 2, 4, 6 and 8 weeks as described by Olaifa and Bello (2011).