

Identification of gut micro flora from market fish common carp (*Cyprinus carpio*) from Jalgaon district, MS, India

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Abstract

The gut micro flora plays important role in fish health and diseases. Gut micro flora shows negative impact on fish nutritive value. Identification of freshwater fish micro flora is essential for the safety of fish intended for human consumption. In this present study, the intestinal micro flora of freshwater fish *Common Carp (Cyprinus carpio)* were analyzed using traditional culture-based techniques collected from local fish market, Jalgaon Dist. Intestinal micro flora was retrieved using the dilution plate technique on selective media. Microorganisms are characterized with the help of morphological and biochemical method. The result of this study revealed that, the bacterial flora of the intestine of freshwater fish consist *Pseudomonas* and *Bacillus Sp.* The present preliminary study shows that isolated strain may have adaptation to utilization of diversity of resources for various purposes in industry.

Keywords: Gut Micro flora, *Common Carp (Cyprinus carpio)*, Jalgaon Fish Market.

Introduction

Fish is a cheapest source of protein for humans in many region of the world and its flesh is rich in proteins providing approximately 16%, minerals, and fat of the animal protein consumed by the world's population [1-2]. *Cyprinus carpio* is a fresh water omnivorous fish, commonly live in the middle and lower streams of rivers, in shallow waters, Such as lakes and water reservoirs and catches throughout the Jalgaon, Maharashtra. It is has a good population density [3-5]. It is commonly sold as a food fish in the local market.

Various studies on the intestinal microflora of fish were carried out from the perspective of food hygiene such as spoilage of fish. However, market fishes are susceptible to a wide variety of bacterial pathogens, which are capable of causing disease. Fishes carries a heavy bacterial load in the digestive tract which plays crucial role in spoilage after the death of the fish. Several authors reported that, the bacterial flora of the digestive tract with different generic composition [6-8]. However, there are many problems unclear as, what normal gut flora is found in species specific, how the variety of dominant species appear, where they come from and how they infect fish [9-11]. Consequently, that makes food security and safety for fish consumption. Hence, identification of the fish gut micro flora is important but very meagre studied were carried out for the microbiological assessment of freshwater market fish of *Cyprinus carpio*. The main purpose of the present study was to provide information on the human pathogenic bacteria found in the intestines of the edible fishes that was sold in Jalgaon Market Centre.

Methodology

Collection of fish from Market

Fish *Cyprinus carpio* were collected from local fish market Jalgaon district, Maharashtra state. Fish was collected during the month of December and January 2020, immediately measured its height is found to be 14 ±2 cm in length.

Isolation and Identification of gut micro flora:

The fish was ventral surface sterilized with alcohol and gut was removed by dissection. The gut was immersed in sterile saline. Bacterial examinations were carried out by wet mount of the saline suspension [12]. Bacterial suspension was streaked on suitable nutrient agar media. Bacteria were isolated by random collection method of colonies from the agar plates. These colonies isolates were repeatedly by sub-culture.

Bacteria identification:

For identification of isolated bacteria, morphological and biochemical analysis were carried out according to Bergey's Manual of Determinative Bacteriology [13-14].

A. Morphological characterization:

Morphological characterization of colony was carried out by observing colony size, colour, colony shape, Grams staining, Texture, elevation, motility, pigmentation, appearance.

B. Biochemical characterization:

The biochemical characterization of the isolated bacteria includes Citrate utilization, Indole production, Methyl red test, Voges–Proskeurs test, Catalase test, Mannitol test, lactose test and Glucose test.

Table 1. Characterization of Isolated bacteria from gut of *Cyprinus carpio*

Characteristics	A1	A2
Morphological characterization		
Colony shape	Circular	Filamentous
Grams Staining	N	P
Motility	P	P
Pigmentation	Yellow	White
Texture	Smooth	Rough
Appearance	Shiny	Shiny
Cell Shape	Rod	Rod
Biochemical characterization		
Indole Reaction	N	N
Voges–Proskeurs	N	P
Mannitol	P	P
Citrate	P	P
Methyl Red	N	N
Glucose	P	P
Catalase	P	P
Lactose	N	Variable
Probability bacteria	<i>Pseudomonas</i>	<i>Bacillus Sp</i>

P- Positive, N- Negative

Results and Discussions

The gut micro flora sample was estimated after isolation and growth on nutrient agar plates incubated at 37 °C. The numbers of cultivable bacteria present in fish gut of selected fishes showing two isolates in Table No.1. Two bacterial isolates from the gut were identified by Bergey's Manual of Determinative Bacteriology (9th Ed) and Aneja, [14]. These two different colonies were isolated were shown identical characterization and its genera were recorded as strains *Pseudomonas* and *Bacillus Sp*. These two isolates were

characterized by analysing their colony characterized by Gram's staining technique for morphological characterization on nutrient agar and also biochemical test. Isolates also exhibited positive reactions to manitol, and motility. Isolates A1 were fluorescent colored, rod shaped with bacillus arrangement which negatively response to the Gram's staining, therefore, identified as *Pseudomonas* species on the other hand, isolates A2 was appeared purple colored, rod shaped, identified as *Bacillus Sp.*

The gut micro floras are important in health and disease, revealing the core micro flora of a species would be important in order to explore. In the present study, confirmed that fish can be infected with two microbial species especially those of bacteria in the freshwater environment. Present findings substantiates with the findings of [10,15] reported that the contamination of the samples where the fishes were caught, before or during handling and marketing which reveal the sanitary condition of the landing centers. Similar reports were noticed by many workers [16-18] that prove the micro flora of digestive tract isolated was the first to be affected by any pollutants appearing in water, which may connect to environmental factors such as water pollution, hygienic procedures of slaughter, transportation, commercialization and preservation conditions [19-22]. The bacterial diversity may be due the hydrobiological fluctuations occurring in the ecosystems [23-24]. Therefore greater attention required to the microflora of edible fishes mainly at market fish. The present study reveals that, the bacterial flora of the intestine of freshwater *Cyprinus carpio*, market fish consists of *Pseudomonas* and *Bacillus Sp* which is crucial for sustenance of public health.

Conclusion

The result of this investigation reveals that, raw fish sold in Jalgaon fish market has moderate contaminated, may be due certain factors like temperature which favors growth of some microorganisms and fish handling method, hygiene, contaminated water of ecosystem, which results the presence of the gut micro

flora of freshwater fish consists only of *Pseudomonas* and *Bacillus Sp.* So, the present study suggested that the urgent need to improve the quality control systems in Jalgaon fish market condition. Hence, present study is worthy for awareness of the management both in aquaculture business and public health.

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