

Antibiotic and Heavy Metal Resistance in Bacteria from Organs of Sewage Fed Farm Fishes

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ABSTRACT

Bacterial populations from organs (viz., liver, spleen, kidney and gill) of *Clarias batrachus* of the sewage fed water areas near IISCo slag disposal site, Dharampur on northern side of Damodar River, Asansol, West Bengal, India, were enumerated, followed by determination of resistance for antibiotics and heavy metals. Maximum resistance is shown against ampicillin (95%) and minimum against ciprofloxacin (5%). Most of the isolates exhibited an increasing order of tolerance for the metals ($\mu\text{g/mL}$) copper (200), cadmium (200), iron (400) and chromium (400), with minimum inhibitory concentration (MIC) ranging from <50 to $1600 \mu\text{g/mL}$. A total of 100 bacteria have been successfully isolated from internal organs of *Clarias batrachus* (*Aeromonas* species (20%); *Escherichia coli*, (45%); *Bacillus* species (4%); *Pseudomonas aeruginosa* (6%), *Staphylococcus aureus* (18%) and coagulate-negative *Staphylococci aureus* (7%)). In terms of antibiotic susceptibility testing, each isolate was tested against 10 antibiotics. The multiple antibiotic resistance (MAR) index of the isolated bacterial ranged from 0.2-0.7. These observations indicate that the bacteria isolates are from a high risk source where antibiotics are frequently used, possibly from sewage effluents. Significant occurrence of bacterial population in organs of fish with high incidence of resistance for antibiotics and heavy metals may pose risk to fish fauna and public health.

KEY WORDS: CLARIAS BATRACHUS, ANTIBIOGRAM, HEAVY METAL RESISTANCE, MULTIPLE ANTIBIOTIC RESISTANCE.

INTRODUCTION

Clarias batrachus, commonly called asian catfish is a threatened (Hossain et al., 2006; Ahmad et al., 2012; Roy et al., 2019), and critically endangered species (Binoy, 2010). It's a promising hardy fish, excellent nutritional profile and market price is high (Hossain et al., 2006; Goswami 2007; Debnath 2011). Tham et al., (2009) have reported heavy metal inhibitions by AchE from *C. batrachus*. Heavy metals are ubiquitous and persist as environmental pollutants that are introduced into the environment through anthropogenic activities, like

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