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High prevalence of CTX-M type of extended-spectrum beta-lactamase-producing bacteria in urban lentic and efflux water

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Drug resistant bacterial infections will cause mortality of extra 10 million people a year worldwide by 2050 unless strict action is taken. Antibiotic resistant bacteria are no longer restricted to clinical setting and have been increasingly reported from natural environment. Antibiotic-resistant bacteria (ARB) have been found widely in aquatic environments. Extended-spectrum β -lactamases (ESBLs) are among the common drug resistance mechanisms. The present study was carried out to determine the prevalence of ESBLs producing bacterial isolates in different water bodies in Delhi-NCR. Of the 282, 117 and 105 non-duplicate bacterial isolates collected from stagnant water bodies, Yamuna River, slaughter house and sewage treatment plant discharge, 20.9, 28.2 and 23.8% isolates respectively were positive for ESBLs production. Characterization of resistance determinants revealed *bla*CTX-M was the most prevalent (81%) type of ESBL. Antibiotic susceptibility test showed that 60 and 52% bacteria respectively were resistant to Polymyxin-B and Colistin while none of the isolate exhibit resistance for Imipenem, Tetracyclin and Ampicillin/Sulbactam. Among the resistant isolates, 36% showed multidrug resistance (MDR) pattern. Minimum Inhibitory Concentration was range > 1024 to >2 μ g/ml. 16s rRNA gene-based identification revealed *Acinetobacter sp.*, *Kluvera sp.*, *Serratia sp.* and *Citrobacter sp.* were predominant. Our data suggest that regular contamination of these water bodies by human population mark the prevailing resistance and their subsequent dissemination to the community microbiota. And there is an urgent need of strong policies and regulations to restrict the further dispersion of drug resistance.

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