

Co-existence of mobile colistin resistance (mcr) gene in carbapenem resistant bacterial isolates from Delhi, India

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Antibiotic resistance is a significant global health concern. Apart from fundamental applications in clinical settings, antibiotics are extensively used in agriculture, food industry and aquaculture. Presence of antibiotics in the ecosystem, serves a potent stimulus to elicit a bacterial adaptation response to develop antibiotic resistance. Increased use of colistin, a last resort drug due to failure of Carbapenems has possibly contributed in development and spread of resistance to colistin among Enterobacteriaceae.

The colistin belongs to the family of Polymyxins, cationic lipopeptides, with broad-spectrum activity against Gram negative bacteria. In this study we obtained 370 non-duplicate bacterial isolates from sewage water and river Yamuna in Delhi and phenotypically screened for colistin resistance. Of the 59 positive isolates colistin resistance gene *mcr-1* was detected among 10 isolates. Chromosomal based genes *phoPQ*, *pmrAB* and *mgrB* were amplified from 5 resistant isolates of *Klebsiella pneumoniae*; sequencing confirmed 4 isolates with wild type genotype but 1 isolates revealed missense mutation in *mgrB* and *phoQ* in *phoPQ* two component systems.

Moreover, carbapenem resistant genes *bla*NDM-5, *bla*VIM, *OXA* was also detected in *mcr-1* positive bacterial isolates. ESBL determinants *bla*CTX-M, *bla*SHV and *bla*TEM were present in colistin resistant bacteria. Furthermore, group specific analysis of CTX-M reveals presence of CTX-M-1 and CTX-M-25 among them. Antibiotic susceptibility test of all isolates against 9 different classes of drugs revealed multidrug resistant phenotype with high MIC values. *In vitro* transconjugation studies showed successful transfer of *mcr-1* and other ESBL resistant determinants. Results of our conjugation studies further highlight the risk for dissemination of *mcr-1* gene and other resistant determinates to other bacteria including clinically important pathogens.

Biography

Firdoos Ahmad Gogry currently works at Microbiology Research Lab, Jamia Millia Islamia and New Delhi, India as Ph.D student. He has done M.Sc Biochemistry from University of Kashmir. His research is antimicrobial resistance and current focus is molecular detection of genetic factors and their diversity conferring Colistin resistance, a last resort drug against infections caused by Carbapenemase and ESBL producing Enterobacteriaceae. He is awarded Senior Research Fellowship from Indian Council of Medical Research (ICMR), Bill and Melinda Gates foundation scientist travel award for World Microbe Forum from ASM and FEMS and young researcher award from Scholars of India (InSc).