Abstract FM 16

HOSPITAL EFFLUENT WATER AS HOTSPOTS FOR ANTIBIOTIC CONTAMINATION AND ANTIBIOTIC RESISTANT GENES IN SRI LANKA

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At present, antibiotic resistance is a major health problem worldwide. Thus, there is a growing interest in exploring antibiotic contamination and the development of antibiotic resistant genes (ARGs) in the environment. Environmental contamination and antibiotic resistance were studied in four antibiotic classes used in medical treatment of humans: Penicillin [amoxicillin (AMX), ampicillin (AMP), cloxacillin (CLOX)], Macrolids [erythromycin (ERM), azithromycin (AZY)], Aminoglycoside [gentamycin (GEN)] and flouro-quinolones [ciprofloxacin (CIP)]. Samples from wastewater were collected in triplicate from 80 hospitals as possible sources. Among the antibiotics selected, the highest concentrations were recorded for AMX (0.001 – 0.024 μg mL^{-1}) and AMP (0.001–0.023 μg mL^{-1}) with lower concentrations in ERM (0.001 – 0.008 μg mL^{-1}), GEN (0.001 μg mL^{-1}), AZY (0.001 – 0.005 μg mL^{-1}), CIP (0.001 – 0.021 μg mL^{-1}) and CLOX (0.001 – 0.011 μg mL^{-1}). Conventional polymerase chain reaction (PCR) was used to screen the selected ARGs (*OPR D, bla TEM, bla OXA, amp a, amp b*) and real time PCR assays to quantify three of these ARGs (*bla TEM, OPR D* and *amp a*). The highest percentage was recorded against *bla TEM* (51%), followed in descending order by *amp a* (15%), *bla OXA* (14%), *OPR D* (5%) and *amp b* (1%). Among the penicillin resistant genes, *bla TEM, OPR D* and *amp a* were selected for quantification based on resistance mechanism and the highest detection frequency. A significant positive correlation (p = 0.001) between the concentrations of penicillin (0.001 μg mL^{-1} – 0.024 μg mL^{-1}) and *bla TEM* gene (7.56×10^{5} – 0.98×10 copies mL^{-1}) was found. The average concentrations of the *OPR D* and *amp a* ranged between 1.2×10^{-1} – 1.56×10^{2} copies mL^{-1} and 1.2×10^{-1} – 6.56×10^{5} copies mL^{-1}, respectively. In conclusion, environmental contaminations through discharge of effluent waste water by antibiotics and the development of resistance against penicillin antibiotics is a seriously emerging environmental concern.

Keywords: Antibiotics, antibiotic resistant genes, Penicillin

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