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Emerging contaminants in hospital effluent: A challenge for water securityAastha Dhingra¹, Sirajuddin Ahmed¹, Weqar Ahmed Siddiqui¹ and Siddhartha Gautam²¹Central University, India²Delhi Pollution Control Committee, India

The hospital effluent is loaded with numerous chemicals, drug residues, hormones, personal care products, disinfectants, microbes, infectious fluids, pathogens, radio-actives, nuclear medicine residues, etc. which adversely impacts the environment. The objective of this study is to analyze the hospital effluent with respect to some priority pharmaceuticals that are environmentally relevant. This study also highlights the challenges in managing the hospital effluent. The priority pharmaceuticals for this study have been identified on the basis of 12 parameters like consumption, toxicity, resistance to treatment, bioaccumulation potential, physicochemical properties, occurrence in environment, etc. The adverse impacts of these pharmaceuticals on aquatic environment were discussed. The five selected pharmaceuticals belonging to different therapeutic classes are: Furosemide; a diuretic, Diclofenac; a non-steroidal anti-inflammatory drug, Carbamazepine; antiepileptic drug, antibiotics like Erythromycin and Ofloxacin. The residues of these pharmaceuticals have been analyzed in the hospital effluent of Delhi by using liquid chromatography mass spectroscopy. The effluent samples have been taken from inlet, secondary clarifier and outlet from pressure filter of the treatment plant of the hospitals. The concentration of diclofenac was maximum at the inlet that is around 7200 ng/L followed by ofloxacin which was 3400 ng/L and furosemide which was 2600 ng/L. The removal rate of ofloxacin is found 66% which is maximum among these five pharmaceuticals and minimum in case of carbamazepine i.e. only 18.7%. Thus, it can be inferred that pharmaceutical residues ranging from 34% to 82% is being discharged into the water bodies. The occurrence of these pharmaceuticals in water bodies poses a challenge for potable water supply and as they are not being currently regulated in wastewater effluents and/or drinking water. Thus there is a need to identify the emerging contaminants and impart adequate treatment at the source to protect the water resources from contamination.

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