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Scientist at NCCS found that wastewater treatment improves quality of water and reduces its pathogen load

By Dr. Bilqeesa Bhat

Scientists at National Centre for Cell Science (NCCS), Pune assessed how process of treatment can modify the microbial content of municipal wastewater in terms of numbers and types of bacteria, especially pathogens. The results indicate that the wastewater treatment process can reduce not only Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD) and total suspended solids, which are parameters commonly measured to assess water quality, but can also effectively reduce the load of pathogenic bacteria, more importantly antibiotic resistant pathogens, in the wastewater.

They examined samples obtained from a municipal wastewater treatment plant in Pune prior to and after treatment. By growing the bacteria from these samples in the laboratory, they investigated how the treatment process influenced the microbial content of the wastewater.

Among various components, municipal wastewater can also contain residual antibiotics inadvertently introduced into the system following their use in hospitals, veterinary medicine, animal farming, etc. Exposure to such antibiotics could cause bacteria to develop antimicrobial resistance. Therefore, research group also studied the resistance of the bacteria in the influent wastewater to twenty-one antibiotics. Prior to treatment, the wastewater contained a wider variety of microorganisms, with high levels of antibiotic resistance. Before treatment, thirty different species of bacteria from eighteen genera were present, while the effluent post-treatment had only nine species of bacteria from six genera. More importantly, pathogens and opportunistic pathogens found in the influent, which also showed resistance to a wide range of antibiotics, and other bacteria that showed multi drug resistance against four or more antibiotics, were found to be absent in the post-treatment effluent.

Cities produce hundreds of million litres of wastewater per day, which contains several undesirable chemical and biological components, including microorganisms. Therefore, this water is treated at wastewater treatment plants (WWTP) before being released into the environment, to minimize its adverse effects on the environment and human health. From the microbial point of view, the treatment process could be considered effective if harmful microorganisms like pathogens are appropriately eliminated from the wastewater.

Contact details:
Dr. Om Prakash Sharma: omprakash@nccs.res.in,
Communication coordinator: Jyoti Rao (jyoti@nccs.res.in)
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