

## Drug-resistant bacteria emerge from drug companies' untreated effluents

Thanks to discharge of untreated effluents from pharmaceutical companies in Hyderabad, water bodies in and around the Patancheru-Bollaram Industrial area are contaminated with antibiotics and antifungal agents leading to the emergence of multidrug-resistant bacteria.

The bacteria from these water bodies have been found to produce enzymes such as extended spectrum beta-lactamases and carbapenemases which can protect them from antibiotics such as penicillin, cephalosporins, cephamycins, and carbapenems. The study was carried out by scientists from Leipzig University, Germany along with a Hyderabad-based NGO Gamana. The results were published in the journal *Infection*.

### Polluted Patancheru

The Patancheru-Bollaram Industrial area, 32 km outside Hyderabad is a growing hub with over 100 industries and more than 30 pharmaceutical manufacturing companies.

Samples were collected from different water bodies — rivers, lakes, ground water, and water from sewage treatment plant to name a few — in the vicinity of the companies as well as from locations far away from the industrial area. All the 16 samples collected from the vicinity of the industrial area and 10 of 12 samples collected from distant locations were contaminated with antifungals and/or antibiotics.

The antifungal agent fluconazole was detected in 13 samples and one particular sewer in the vicinity of the industrial area showed levels as high as 20 times greater than therapeutically desired levels in blood in patients. According to the scientists, this is the highest concentration of any drug ever measured in the environment.

The other anti-infectives found in the waters included antifungal medicine voriconazole, medications for bacterial infections such as moxifloxacin, linezolid, levofloxacin, clarithromycin, ciprofloxacin, ampicillin, doxycycline, trimethoprim and sulfamethoxazole.

### Monster microbes

The bacterial isolates from the different samples were tested for drug resistance. Except two samples taken from tap water away from the industrial area, the remaining samples showed bacteria containing drug-resistant genes.

Carbapenemase-producing enterobacteria and non-fermenting bacteria such as *Acinetobacter* and *Pseudomonas* species were found in more than 95% of all water samples collected. This finding further confirms previous studies that there is a strong association between drug pollution and presence of multidrug-resistant bacteria.

"The sewage treatment plant at Patancheru is ill equipped to treat pharmaceutical wastewater containing effluents with different chemical compositions. So it simply discharges it into the river. There have been complaints that they just mix household waste water from BHEL Township with these industrial effluents and discharge it into the river. As a result, the water in the Musi river has started to turn foamy," Mr. Anil Dayakar from Gamana NGO and one of the authors of the paper.

Despite the Supreme Court demanding last year that the industries in the Patancheru-Bollaram area should treat wastewater and reuse it, "massive violations" have been the norm.

“The ground water in this area is yellow. The villagers who live around this estate have many skin problems. Though there is a water treatment plant nearby, it is not really of use. Despite decades of campaigning by local NGOs the pollution has not been reduced. In 2009, the national pollution index classified this industrial area as ‘critically polluted,’” says Mr. Dayakar.

Lifestyle-related risk factors are being cited, compounded by an inadequate number of treatment centres in the region

Without policies to stop the worrying spread of antimicrobial resistance, the mortality rate could be disturbing

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