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Abstract

Characterization of the Antibiotic and Heavy Metal Resistant Common Enterobacteriaceae Found in Textile Industrial Effluents

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Abstract:

The effluents of textile industries have considerable amounts of heavy metals causing potential microbial metal loads, if discharged in the environment without treatment. Aim: In this present study, both lactose and non-lactose fermenting bacterial isolates were isolated from textile industrial effluents of a specific region of Bangladesh, named Savar, to compare and understand the load of heavy metals in these microorganisms determining the effects of heavy metal resistance properties on antibiotic resistance. To detect the combined effect of heavy metals and antibiotics, a binary exposure experiment was performed and to understand the plasmid profiling, plasmid DNA was extracted by alkaline lysis method of some selective isolates. Most of the cases, the colony forming units (CFU) per plate for 50 ul diluted samplewere uncountable at 10-6 dilution, however, countable for 10-10 dilution and it didn't vary much from canal to canal. A total of 50 Shigella, 50 Salmonella, and 100 E.coli (Esherichia coli)like bacterial isolates were selected for this study where the MIC was ≤ 0.6 mM for 100% Shigella and Salmonella like isolates, however, only 3% E. coli like isolates had the same MIC for nickel (Ni). The MIC for chromium (Cr) was ≤ 2.0 mM for 16% Shigella, 20% Salmonella, and 17% E. coli like isolates. Around 60% both Shigella and Salmonella, but only 20% E.coli like isolates had a MIC of ≤ 1.2 mM for lead (Pb). The most prevalent resistant pattern for azithromycin (AZM) for Shigella and Salmonella like isolates was found 38% and 48%, respectively, however, for E.coli like isolates, the highest pattern (36%) was found for sulfamethoxazole-trimethoprim (SXT). The highest sized plasmid was found 21 Kb and 14 Kb for lactose and non-lactose fermenting isolates, respectively. Conclusion:Microbial resistance to antibiotics and metal ions, has potential health hazards, because these traits are generally associated with transmissible plasmids.

Biography:

Afroza Parvin is a faculty member ofJahangirnagar University in Bangladesh and now she is in study leave from her profession and pursuing her MSc degree in Biosystems Engineering at University of Manitoba, Canada. She is already holding a BScamd MScdegree in Biochemistry and Molecular Biology.

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