

Microbial Profile and Heavy Metals Resistance among Municipal Wastewater (Al-Yohedia Stream) in Hilla City, Iraq

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Abstract: Municipal Wastewater mainly composed of chemical pollutants (like heavy metals) and biological pollutant (like microbes). Municipal waste water samples were collected from four sites along Al-Yohedia Stream in Hilla City, Iraq and the samples were subjected to study the heavy metals concentration, Microbial profile, Antibigram and presence of heavy metals efflux pump (CusCFBA) among Gram-negative isolates. The results revealed occurrence of high concentration of heavy metals includes (from high to low): Nickel > Manganese > Iron > Cadmium > Copper > Lead. The results also display the presence of many pathogenic bacteria and Candida spp. in all four sites includes: Escherichia coli, Klebsiella pneumoniae, Pseudomonas aeruginosa, Staphylococcus aureus, Enterococcus faecalis, Vibrio cholerae and Vibrio parahaemolyticus. The candida spp. includes: Candida albicans, Candida krusei and Candida glabrata. Among Gram-negative isolates, high resistance (91.66% and 83.33%) were recorded for Amoxicillin-clavulanic acid and cefotaxime respectively while low level of resistance were showed for the rest. Resistance to clarithromycin were noted to all S. aureus isolates and vancomycin resistance E. faecalis were also documented. Full resistance to ketoconazole and miconazole while resistance to itraconazole and fluconazole were (90.90% and 81.81%) respectively. The presence of CusCFBA efflux pump among enterobacteria were verified via presence of outer membrane protein gene (*cusC*) among three isolates of E. coli and one isolate of K. pneumonia. This study conclude high concentration of most of heavy metals among waste water and emergence multidrug resistance and heavy metals resistance bacteria and Candida spp. and this resistance may attributed to presence of heavy metals and drug efflux pump among those microbes especially CusCFBA pump among Gram-negative isolates.

Keywords : Heavy Metals, Microbes, CusCFBA.