MICROBIOLOGICAL INDICATORS OF CONTAMINATION IN SEDIMENTS IN THE LAGUNA DE BUSTILLOS, CUAUHTEMOC, CHIHUAHUA, MEXICO

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Abstract: The Laguna de Bustillos in the municipality of Cuauhtémoc, Chihuahua, Mexico, is one of the major bodies of water in the region. This natural lake is used by residents, industries and farmers for agricultural and domestic uses. Unfortunately, this lake has also been used for industrial, agricultural and domestic wastewater discharge, causing water contamination. The objective of this research was to determine the microbial contamination in sediments from the Laguna de Bustillos to find a possible correlation to the different anthropogenic activities found in the area. Twenty-eight location points were randomly selected in the lake. Two soil samples at different depths were then taken at each point; 0-10 cm (a) and 10-20 cm depth (b). The sediment samples were air dried and conserved in plastic containers until analysis. The microbiological analysis included total and fecal coliforms (especially Escherichia coli) using the MPN method with lactose broth initially, followed by the inoculation of specific media for E. coli. The samples were also analyzed for the presence of Salmonella spp with enriched and selective agar using the membrane plaque method. The samples were also tested for the enumeration of antibiotic resistant bacteria, adding lincomycin, gentamicin, ampicillin and amikacin to Plate Count Agar plates, which were inoculated with serial dilutions of the sediment. According to the results, total coliforms were found mainly on the surface of the sediment column (a) since 27 samples from this depth were positive, compared to only 18 positive in (b). None of the samples tested positive for fecal coliforms or E. coli. All samples tested for Salmonella spp. were negative at both sampling depths. Finally, bacterial resistance showed that bacterial cells were highly sensitive to amikacin. The low coliform counts can be attributed to the low number of viable bacterial cells or to the competence of allochtonus microorganisms in those environments. The wide variety of antibiotic resistant bacteria indicates that bacteria had come in contact with antibiotics or antibiotic resistant strains. The wide variety of antibiotic resistant strains strengthens the proposal that this determination can be used as an indicator of the contamination of wastewater and soil by human activities

Key words: Escherichia coli, Salmonella spp., antibiotic resistance, wastewater, soil sediments.