MICROBIOLOGICAL WATER QUALITY ASSESSMENT IN BAYOU CUMBEST MISSISSIPPI

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Abstract: Bayou Cumbest is located in the coastal streams basin of Mississippi. There are no municipal wastewaters or industrial facilities in the bayou Cumbest watershed permitted to discharge to surface waters. Like in other aquatic environments this bay is seriously contaminated by various microorganisms including pathogenic bacteria, which play a significant role in the causation of human health problems. The purpose of the present study was to evaluate the bacteriological quality of water in the Bayou Cumbest. The levels and temporal variations of indicator microorganisms were also evaluated. To achieve this goal, water samples were collected aseptically every month in four different stations in the bayou Cumbest and tested for the presence of indicator microorganisms including: heterotrophic plate count, total coliforms, fecal coliforms, and enterococcus bacteria by means of membrane filtration technique. We also tested the physicochemical parameters, which include temperature, pH, turbidity, dissolved oxygen, and conductivity using standard methods. The results (colony forming units per 100 ml of water) from 2004 to 2007 in a yearly respective order indicate the mean levels of heterotrophic plate count were: \(2.8 \times 10^4 \pm 1.0 \times 10^4\), \(7.4 \times 10^3 \pm 5.0 \times 10^3\), \(8.6 \times 10^3 \pm 4.0 \times 10^3\), and \(2.5 \times 10^4 \pm 1.8 \times 10^4\), respectively. For total coliforms the results were 731\(\pm\)655, 1473\(\pm\)471, 1246\(\pm\)296, and 1106\(\pm\)608 respectively. The mean averages for fecal coliforms were: 168\(\pm\)78, 99\(\pm\)76, 70\(\pm\)99, and 98\(\pm\)77, respectively. The mean numbers of enterococcus bacteria were computed to be: 85\(\pm\)36, 59\(\pm\)38, 65\(\pm\)42, and 99\(\pm\)68, respectively. Significant seasonal variation (p < 0.0001) in mean bacteria concentration was observed and reached the peak during the winter and summer. Mean values of both physical and chemical parameters were within the acceptable levels. Due to lower mean numbers of fecal coliform and enterococcus compared to the maximum recommended by federal and the state of Mississippi, water in bayou Cumbest may not be associated with gastrointestinal infections, but considering only maximum numbers, these bacteria were sometimes above the recommended levels and raised public health concerns. High numbers of heterotrophic and total coliform bacteria suggest poor quality of water in the bay. Steps should be taken to identify the source and prevent the bacteria contamination of the bayou.

Keywords: Pathogenic, bayous, membrane filtration, human health

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