

Microbiological quality assessment of beach sand in Uswatakeiyawa, Prithipura coastal area, Sri Lanka

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Assessment of microbiological quality of beach sand has become one of the essential factors in many countries to reduce the risk on health of the bathers and others using these beaches for recreational activities. According to recent studies beach sand may act as a source of fecal pathogens for the overlying seawater. This study was designed to assess the microbiological quality of beach sand of a popular bathing beach at Prithipura, Uswatakeiyawa. Two sampling sites were selected with a distance of 150m and the samples were collected from April to September 2015. Microbiological quality of sand was monitored by testing for *Enterococcus* (as fecal streptococci -FS), coliforms, thermo-tolerant coliforms (as fecal coliforms- FC) and *E. coli* according to APHA and UNEP standards. *Staphylococcus aureus* and *Pseudomonas* were also monitored using Mannitol Salt Agar and Pseudomonas Selective Agar respectively. Temperature, salinity, conductivity, TDS and pH were measured at the sites to assess their effect on microbial growth.

Analysis of enterococci levels in sand was ranged from 112-400 MPN/100ml with an average level of 353 MPN/100ml. The average coliform content was 1111 MPN/100ml which was ranged from 40-1600 MPN/100ml. The average counts for thermo-tolerant coliforms and *E. coli* were 257 MPN/100ml and 80 MPN/100ml respectively. Microbiological counts from two sites were not significantly different when subjected to 2-sample t-test using Minitab 14 statistical software. *Staphylococcus aureus* was absent in most of the samples, but the average level was 9.42×10^3 CFU/ml. *Pseudomonas spp.* showed a higher average value of 3.40×10^4 CFU/ml. The Pearson correlation test performed for all microbial and physical parameters indicated a negative correlation between *Pseudomonas* and temperature (-0.665, 0.036 and -0.774, 0.014) and a positive correlation between fecal coliforms and *E. coli* (0.625, 0.05 and 0.7, 0.024) at both sites. The average values of pH, conductivity and salinity were 7.89, 2.21 mS/cm and 1.1 ppt respectively.

Furthermore, the ratios of FC/FS ranged <0.7 – 4.0 but none of the samples exceeded 4.0 of which many were within the range of 0.7-2.0 providing evidence that a main and frequent cause of pollution is domestic animal wastes. However, one sample showed a value of 3.8 (FC/FS) which is an indicative of predominant human waste pollution.