

## Physico-chemical parameters and bacteria as indicators of sewage pollution in Negombo lagoon, Sri Lanka

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The Negombo lagoon is one of the coastal lagoons in an urbanized city in the North-western province of Sri Lanka. The lagoon is heavily surrounded by human settlements, farms, aquaculture, and hospitals, which exposes it to sewage pollution. Locating and assessing the effluent discharge points into the lagoon is very important to know the ecological status in terms of fish health and water quality conditions. This research assesses the sanitary risk of the Negombo lagoon by using the concentration of fecal coliform and their closely correlated water quality parameters. It was hypothesized that the effluent discharge points with poor water quality conditions will have high fecal coliform concentrations compared to locations of moderate to good water quality conditions. It was also hypothesized that oysters (*Crassostrea* sp.) in the poorest water quality conditions will have high concentrations of fecal coliform in their bodies. The sedentary and filter-feeding behaviour of oysters makes them a perfect fit to understand the sanitary risk of the lagoon fauna. As a first step, the communities surrounding the Negombo lagoon will be interviewed using a snowball sampling technique to identify the locations of the lagoon that contain effluent discharge points after which those locations will be visited for field verification. The survey will be followed by a focus group discussion with various stakeholders whose activities contribute to the sewage effluent that ends up in the lagoon. All locations with human activities (e.g., piggery farms, swimming, hospital canals, etc.) that pose a sanitary risk will be selected for sampling. At each sampling location, triplicates of water samples will be collected at three different depths (i.e., 15-20 cm below surface water, 1 m depth and 2 m bottom depth) and *in situ* physico-chemical parameters (e.g., dissolved oxygen, etc.) will be determined. Six adult oysters will be handpicked at the bottom within a 2 m radius of each sampling location. The concentrations of fecal coliform will be determined from the water samples and oyster meat using the Most Probable Number (MPN) method. A water quality index (WQI) will be computed for the different sampling locations to determine their pollution level. A one-way ANOVA test will be performed to determine whether the water quality parameters are significantly different between the sampling locations. A Redundancy Analysis (RDA) will be performed on the physico-chemical and bacteriological parameters to determine whether the correlation between the level of pollution and the abundance of fecal coliform is significant. Moreover, a one-way ANOVA test will be performed to determine whether there is a difference between the concentrations of faecal coliform in the water column and the bodies of oysters. The results will reveal whether water quality parameters such as dissolved oxygen, nitrate and phosphate concentrations are significantly associated with the concentrations of fecal coliform in oyster meat and lagoon water samples. Furthermore, to ascertain whether the sanitary condition of Negombo lagoon is of public health significance.

## References

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