

**A PRELIMINARY STUDY ON IMPACT OF  
COOLING WATER DISCHARGE OF COAL  
POWER PLANT ON MARINE PHYTOPLANKTON  
IN NOROCHCHOLAI COAST, KALPITIYA  
PENINSULA**

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## ABSTRACT

Lakvijaya power plant is the first coal fired power plant in Sri Lanka which is situated in the North-west coast in the Kalpitiya peninsula.  $15 \text{ m}^3\text{s}^{-1}$  cooling water is discharged by the cooling system of power plant to the adjacent marine environment. Thus, the present study was carried out to assess the impact of this cooling water discharge on marine phytoplankton during the period of June to August 2013 in the south west monsoon period. Water quality parameters and phytoplankton samples were collected three times from 12 sampling locations as covering four sites labeled as A, B, C, and D. The site A located closer to cooling water outlet, Site C and D located at where thermal plume movement occurring path. Site B was considered as reference site. The study revealed that the temperature, phytoplankton abundance, chlorophyll-*a*, dissolved oxygen and pH varied significantly among the sites at  $p=0.05$ . The significantly high mean phytoplankton abundance ( $9.49 \times 10^4 \text{ indi. l}^{-1}$ ) was reported at site B than the other three sites. Multiple correlation analysis revealed that phytoplankton abundance was negatively correlated with temperature ( $r=-0.83$ ) at  $p=0.01$  showing impact of temperature on phytoplankton abundance. Furthermore, phytoplankton abundance was positively correlated ( $r=0.89$ ) with chlorophyll-*a* at  $p=0.01$ . The mean temperature and mean phytoplankton abundance varied from 28.7 to 32.0 °C and  $9.49 \times 10^4$  to  $5.67 \times 10^4 \text{ indi. l}^{-1}$  among sites respectively. In this study Bacillariophyceae and Dinophyceae were the main phytoplankton groups found in all sites and the major group was Bacillariophyceae with composition of 99.84 %. The most dominant phytoplankton were *Melosira sp.*-27.84 % and *Coscinodiscus sp.*-34.51% based on the composition analysis of phytoplankton. The study revealed that A, C, and D sites were located within the impacted zone from the coal power plant during the study. Also the study revealed that the thermal pollution is due to release of cooling water more localized during the study period. However in depth study is required to assess the seasonal variation and other impact on marine environment.

*Keywords: cooling water; Lakvijaya power plant; phytoplankton; temperature*