

Microbiological quality of ballast water discharged from ships arriving in Colombo inner harbor

C. D. Jayasundera^{1*}, I. V. N. Rathnayake¹

¹Department of Microbiology, Faculty of Science, University of Kelaniya
^{*}chathurijay4@gmail.com

Abstract

Out of the many threats that occur to the marine environment, one is largely attributed to the movement of ships resulting in the carriage of marine life adhering to hulls and/or being caught up in ballast water from one location to another, leading to the invasion of certain types of marine life into another regions. In the Ballast Water Management Convention, the International Maritime Organization (IMO) has stated legal limits for several indicator microorganisms for ballast water discharged by vessels.

The present study was planned to determine the amounts of indicator microorganisms present in ballast water collected from vessels arriving in the Colombo inner harbor and to see whether they are below the legal limits and to compare with sea water (inner and outer harbor). A comparative study on the physico-chemical parameters of the sea water baseline values and ballast water was determined using One-way ANOVA in the MINITAB 14 software package. The indicator microorganisms of concern were *E. coli*, intestinal *Enterococci* and toxicogenic *Vibrio cholerae* (O1 and O139). All the indicator microorganisms were detected and enumerated using culture based techniques.

A significant difference in the values of the total viable count of both seawater and ballast water was observed. The physico-chemical parameters of both ballast water and seawater were significantly different ($p < 0.05$) according to the statistical analysis. And this may have led to the significant difference in the total viable counts of marine microorganisms. The *E. coli* levels of all ballast water samples collected were below the legal limit while

those of the seawater samples were significantly high some even exceeding the value given in the convention. Also the total viable counts of the marine microorganisms were higher in sea water. Even though the toxigenic *Vibrio cholerae* (O1 and O139) were not present in ballast water some other non-agglutinating vibrios were isolated. None of the ballast water or seawater samples contained intestinal *Enterococci* which may be due to the effect of environmental stresses on the growth of them.

Key words : *Ballast water, Ballast Water Management Convention, Indicator microorganisms, Physico-Chemical parameters, Culture based techniques*