

An Enzymatic Method for the Detection of Coliform Bacteria and *Escherichia coli* for Water Quality Assessment in Sri Lanka

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Total coliform bacteria and *Escherichia coli* have been extensively used as indicators of water quality monitoring around the world. Conventionally, most probable number method (MPN) and membrane filtration (MF) methods have been used to detect and enumerate these indicator bacteria for decades. These methods are based on the conventional definition of coliforms as being organisms capable of fermenting lactose with production of acid at 37 °C. In addition, several chromogenic and fluorogenic media based on the detection of enzymatic activities are also available and have recently been gaining popularity, especially in developed countries. Methods based on the detection of β-D galactosidase and β-D glucuronidase have been widely adopted for the detection of coliforms and *Escherichia coli* respectively. One such method, the Coilert system (IDEXX Inc., USA) has been extensively used for the detection of these organisms in water.

In Sri Lanka, for bacteriological analysis of water MPN and MF techniques are recommended by the Sri Lanka Standards Bureau (SLS 614: Part 2: 1983). However, these two techniques are costly, time and labour consuming methods. In the current study, the MPN method was compared with the Coilert method for the detection and enumeration of total coliforms and *Escherichia coli* in different water sources; treated tap water (n = 12), bottled water (n = 12), well water (n=12), river water (n=12) and waste water effluent (n=12).

When comparing the two methods, the interpretation of positive presumptive tubes in MPN method was subjective, as the detection of gas production and acid reaction were not distinctly clear in certain trials. On the other hand, Coilert method gave a distinct colour change from colourless to yellow and fluorescence under long wave (366 nm) UV illumination in detecting total coliforms and *Escherichia coli* respectively. Statistical analysis of data using Mean Separation Test showed significantly ($p \leq 0.5$) higher counts of total coliforms by Coilert method compared to MPN method at 58.3% of the sampling attempts. Compared to MPN method, the Coilert method detected significantly higher counts of *Escherichia coli* at 20 % of the sampling attempts during the study. Further precise studies on sensitivity testing of alternative methods will be required to examine the potential use of this method for bacteriological water quality monitoring in Sri Lanka.