

IDEXX

Literature Cover Sheet

IDEXX Library #: 6D

Topic: Tropical Field Testing

Title: "On-site Bacteriological Test for Potable Water" (Internet-posted summary)

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Date: April 1, 1994

Source: <http://nativenet.uthscsa.edu/archive/nl/9404/0061.html>

Highlights:

- Australia's Murdoch University evaluated Colilert and Colisure's suitability for field testing in the remote regions of Western Australia
- They found that "the Colilert P/A and the Colisure P/A are appropriate portable water testing kits for use in remote Aboriginal communities, as they meet the following criteria:
 - they are as reliable and sensitive as the methods used by the State Health Laboratory of Western Australia.
 - they are easy to operate, and provide the lowest risk of external contamination.
 - the results from the Colilert and Colisure are easy to interpret."

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Date: Fri, 1 Apr 1994 23:40:07 +0800

Subject: ET-PERTH 1.5 SUMMARY:On-site Bacteriological Test for Potable Water

On-site Bacteriological Test for Potable Water

Paper 1.5 Contains Summary, Introduction and Conclusion.

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Summary

Bacteriological water quality from remote communities in Western Australia is difficult to test because of the distance to health laboratories, the need for aseptic sampling conditions, the lack of skilled workers and the high temperatures involved when transporting samples. Kits have been developed that can test for bacteria at the point of sampling. These have the advantage that they are cheaper, less complicated to operate, easier to interpret and take less time to complete than the standard laboratory procedures. The Colilert and Colisure kits were tested, with the aim to produce a video and explanatory brochure that can be used to train people in remote communities. It was concluded that both kits are adequate for the purpose of a portable testing kit, and that the Presence/Absence format was more suitable for use by the Environmental Health Worker.

INTRODUCTION

Routine testing of water quality is a public health requirement, and the National Guidelines for Drinking Water Quality in Australia recommend frequent sampling for microbial constituents, at least once a month, and preferably once a fortnight (NHMRC, 1987). Despite the acceptance of these guidelines, the majority of remote Aboriginal communities in Western Australia do not at present have any form of water testing. Of the 250 (approximately) communities in Western Australia, only 48 of them are funded to receive water testing and maintenance. Those communities receiving funding are tested every four to eight weeks, but the site for testing is immediately after the storage tank, which means that the sampled water may not be of the same quality as the drinking water. Those communities not receiving funding cannot get their water tested due to the high transportation costs, and the lack of access to a laboratory.

To improve this situation, research has focussed on the development and adaptation of portable water testing kits for use in remote Aboriginal communities. These would have the advantage of being faster, cheaper and able to be used by trained Aboriginal personnel. Turner and Mathew (1991) compared the Colilert, DeLaqua, Millipore One Use Unit and Millipore

Dipslides for their applicability for use in remote Aboriginal communities. They recommended the Colilert Presence/Absence as it is a one-step test that is easy to use, easy to interpret and was found to be as sensitive and reliable as the methods used by the State Health Laboratories of Western Australia. National evaluations by Edberg et al. (1988, 1989) and further evaluations by Clark and El-Shaarawi (1993), McFeters et al. (1993) and Covert et al. (1992) have supported the conclusion that the Colilert is equal in performance to the standard methods employed for the differentiation of total coliforms from water.

The choice of Colilert over the other portable test kits was primarily due to its ease in operation and interpretation. The Colilert is an MPN method designed for the differentiation and enumeration of total coliforms and *E. coli* from water in 24 hours. It consists of a dry blended reagent dispensed in a sterile five-tube MPN, six-tube MPN, ten-tube MPN or a 100ml P/A (Colilert promotional brochure). The water sample is added to the tubes, which are then incubated for 24 hours at 37°C. Tubes receiving one or more of the total coliform organisms will show a colour change from clear to yellow, and the most probable number of organisms in the sample can then be estimated. Tubes receiving *E. coli* can be identified by fluorescence under a long-wave ultraviolet (U.V.) lamp.

It was not until a late stage in the study that an additional portable test became available; the Colisure. The Colisure is an MPN test that is very similar to the Colilert, dispensed in either a five tube MPN (20ml in each tube) or a 100ml P/A. After incubation for 24 hours at 37°C, a colour change from yellow to red indicates the presence of one or more coliform organisms, and the presence of *E. coli* is identified by fluorescence under a long-wave U.V. lamp.

Unlike the Colilert, the Colisure P/A test has the reagent pre-dispensed in a sterile 100ml bottle. As the Colilert P/A test was recommended over the MPN for use in remote Aboriginal communities due to the reduced avenues for contamination, this aspect of the Colisure P/A was seen as an advantage over the Colilert P/A. The purpose of this study, then, was to evaluate the Colisure P/A to determine its potential as a field testing kit. The reliability and sensitivity of the Colisure P/A for the differentiation of total coliforms and *E. coli* from water was compared to that of the Colilert and to the methods employed by the State Health Laboratories of Western Australia (SHL).

In addition to this, the performance of the Colisure and Colilert P/A tests was compared to the results obtained by the methods used by the SHL after the sample water had been delayed for 21 hours. This is to simulate the field situation, where the water may be analysed immediately by the Colilert or Colisure, but transported to the SHL, thus involving a "delay" from the time of sampling to the processing time.

CONCLUSIONS

1. The Colisure P/A is as reliable and sensitive for the differentiation of total coliforms and E. coli from water as the methods used by the State Health Laboratories of Western Australia.

2. The Colisure P/A is as reliable and sensitive for the differentiation of total coliforms and E. coli from water as the Colilert P/A.

3. The Colilert P/A and the Colisure P/A are appropriate portable water testing kits for use in remote Aboriginal communities, as they meet the following criteria:

- * they are as reliable and sensitive as the methods used by the State Health Laboratory of Western Australia.
- * they are easy to operate, and provide the lowest risk of external contamination.
- * the results from the Colilert and Colisure are easy to interpret.
- * only one temperature is needed to differentiate both total coliforms and E. coli, and thus only one incubator is necessary.

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