

## TROPICAL DISEASES

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## RESEARCH CENTRE

P O Box 71769  
NDOLA, ZAMBIA

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Clinical & Public Health Microbiology

31<sup>st</sup> may 2006

  
Thru: Dr. E. Kafwembe PhD  
Director/TDRC

Reid anderton  
Eagles wings,  
PO Box 240282,  
Ndola

Dear Sir,

**RE: REPORT ON THE EVALUATION OF A WATER  
PURIFICATION SYSTEM ON WATER SAMPLES FROM  
VARIOUS COMMUNITIES IN NDOLA DISTRICT.**

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In response to your request for TDRC microbiology laboratory to perform an evaluation of the waterstick purifier manufactured by seldom Laboratories USA. The system was tested on water samples collected from sites in various communities of Ndola. Find attached the report for the analysis performed.

Also enclosed for your attention is the bill for the analysis at reduced charge of ZMK 60,000.00 per sample in the total amount **ZKW 960,000.00 payable to "TDRC Microbiology Fieldmal account"**.

Yours in quality and equity Health services,  
TROPICAL DISEASES RESEARCH CENTRE

  
Mathias Tembo BSc DLSHTM MSc  
**SCIENTIFIC OFFICER/HEAD OF MICROBIOLOGY**

Cc: HOD, Biomedical Sciences  
TDRC Accountant

# **TROPICAL DISEASES REASERCH CENTRE**

**NDOLA, ZAMBIA.**

**REPORT ON THE EVALUATION OF A WATER  
PURIFICATION SYSTEM ON WATER SAMPLES FROM  
VARIOUS COMMUNITIES IN NDOLA DISTRICT.**

**Report prepared by:**

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**May 2006.**

## **1.0 Introduction**

Annually, 2 to 3 million children 5 years old die of diarrhoeal diseases, a large proportion of which are acquired through exposure to contaminated water. Though large portions of money have been invested for safe water, the problems of waterborne disease still persist due to various reasons. Population shifts from rural to urban areas have stressed the existing water and sanitation infrastructure.

The World Health Organisation has estimated that up to 80% of all sickness and disease in the world is caused by inadequate sanitation and polluted water, or unavailability of water. Approximately three out of five persons in developing countries do not have access to safe drinking water. The benefits to be derived from improved water supply are immense. To secure such benefits the TDRC water microbiology laboratory unit monitors, from time to time the bacteriological quality of drinking water around communities in Ndola.

Eagles Wings management requested the TDRC Microbiology laboratory to evaluate the performance of the waterstick purifier manufactured by Seldon Laboratories, LLC in the USA as an alternative water treatment method.

## **2.0 Objectives**

- i. To check if the water purification kit operates effectively.
- ii. To check if the water is clean / potable after being run through the filter system.
- iii. To check the bacteriological quality of water after it has been passed through the water purification kit.

## **3.0 Methods**

### **3.1 Water Samples**

On 30<sup>th</sup> May 2006, TDRC Microbiology unit staff sampled water from eight (8) residential and public water distribution outlets in Ndola, namely: Main Masala, Nkwazi, Pamodzi, Chifubu, Chipulukusu, Kawama, and Kabushi. 16 water samples were collected from taps at each selected site, which included household taps, market taps, and communal taps. Two samples were collected from each collection point. All samples were then transported to the TDRC Microbiology laboratory for analysis.

### **3.2 Bacteriological Analysis**

#### **3.2.1 Sample Preparation**

To know the quality of the water before purifying; one 100ml sample was filtered using the water purifying Kit while the other 100ml sample was not.

All samples were then analysed for bacteriological contamination using the HACH Millipore membrane filtration method according to manufactures instructions and cultured on mFC media. The incubation conditions were favourable for detection of *Escherichia coli* an organism that indicates possible faecal contamination. The same conditions also allow the growth of other coliforms that usually indicate environmental contamination of water.

## 4.0 RESULTS

The bacteriological results of the analysed samples were as shown in the table below.

No.	Area	Sampling point	Waterstick purified	Total coliforms	<i>E.coli</i>
1.	Main Masala	Market tap	No	0	0
			Yes	0	0
2.	Nkwazi	KWASC Kioski 04 tap	No	0	0
			Yes	0	0
3.	Chifubu	Residential tap house CHT 4899	No	0	0
			Yes	0	0
4.	Kawama	Market tap	No	0	0
			Yes	0	0
5.	Kabushi	Market tap	No	0	0
			Yes	0	0
6.	Pamodzi	Market tap	No	0	58
			Yes	0	0
7.	Mushili	Residential tap House No. 0139	No	0	0
			Yes	0	0
8.	Chipulukusu	Middle Basic School tap	No	0	0
			Yes	0	0
9.	Positive Control	TDRC <i>E.coli</i> strains	No	0	TNTC
			Yes	0	0
10.	Negative control	Sterile Distilled water	No	0	0
			Yes	0	0

TNTC = To Numerous To Count

## 5.0 DISCUSION OF RESULTS

### 5.1 Bacteriological levels

According to the World Health Organization, all water intended for drinking and all treated water in the distribution system must not have any *E. coli* or thermotolelant coliforms detectable in any 100mls of water sample. Contamination due to *E.coli* was assessed and the results obtained demonstrated no contamination due to *E.coli* though the water samples from Pomodizi demonstrated contamination with *E.coli* an indicator that there was faecal contamination. The other water sample gotten from the same source did not demonstrate bacterial contamination after it had been purified by the waterstick purifier. A positive control was made by suspending a heavy growth of *E.coli* into sterile distilled water. Some of this water was inoculated on to the test media, while the remainder was purified by the water stick. It was found that there was heavy growth from the control sample that was not purified and no growth from the control that had been purified.

## 6.0 CONCLUSION

- The bacteriological contamination level of all the purified water samples using the waterstick were acceptable for drinking, as they met the World Health Organization (WHO) guidelines.
- However, the unpurified water samples from the positive control and pamodzi were unacceptable for drinking purposes as they did not meet WHO guidelines
- Cloudy and dirty water was found to be clean and clear after passing it through the waterstick filter.
- The water stick was found to be able to effectively filter out the bacteria *E. coli* a recommended indicator of faecal contamination by WHO.

## 7.0 RECOMMENDATION

- It is recommended that the water stick be evaluated periodically.

## 8.0 REFERENCE

WHO (1996) Guidelines for drinking water 2<sup>nd</sup> Ed. Vol. 2. Health criteria and other supporting information

