A WELL FACTSHEET

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In many emergency situations it is necessary to undertake rapid assessment of water sources to determine their suitability for the supply of drinking water to affected communities. A key aspect of this assessment is to determine the microbiological quality of the water in order to determine the water treatment requirements. Most conventional methods of microbiological water quality field testing rely on membrane filtration which is relatively difficult to apply in a precarious field situation and requires significant training in the operation of equipment. There are, however, alternative methods available on the market which offer improved ease of use. This factsheet describes some of the key options available, with their advantages and limitations, and outlines a recommended field approach for microbiological water quality testing in emergencies.

Ob c

In an emergency situation a method of microbiological water quality testing is required which:

- is simple to understand and use (requiring minimal training);
- achieves results rapidly (within 24 hours);
- does not require many items of equipment (such as chemicals, power source, incubator etc.);
- is relatively inexpensive; and
- is reasonably accurate (especially at coliform concentrations above 100cfu/100ml)

Many relief agencies use the guideline values given in Table 1 (adapted from Médecins Sans Frontières, 1994) to assess the water treatment required.

Guidelines for water treatment (MSF, 1994)

Faecal (thermotolerant) coliform concentration	Remark / Action
<10 cfu / 100ml	Water may be consumed as it is
10 - 100 cfu / 100ml	Treat if possible but may possibly be consumed as it is
100 - 1000 cfu / 100ml	Must be treated
>1000 cfu / 100ml	Rejected or treated very thoroughly

It is therefore most crucial that coliform concentrations above 100cfu/100ml can be detected accurately. However, it should also be possible to detect levels between 10 and 100cfu/100ml.

M d a a ab

In an emergency there is insufficient time to send samples to a laboratory for analysis. Consequently, field methods are required that can be conducted on site. The key field methods available fall into three categories;

- Membrane filtration;
- Presence/Absence; and
- Petrifilm.

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Membrane filtration is the traditional method used to detect total and faecal (thermotolerant coliforms). Commercial field testing kits utilising membrance filtration include the DelAgua®, Coli [illegible] ab. The general prorahe general pf8g9-26.5 (t t12.4 (ic)-a0.4 (e)-T (i)1cy)-10.4 (e)

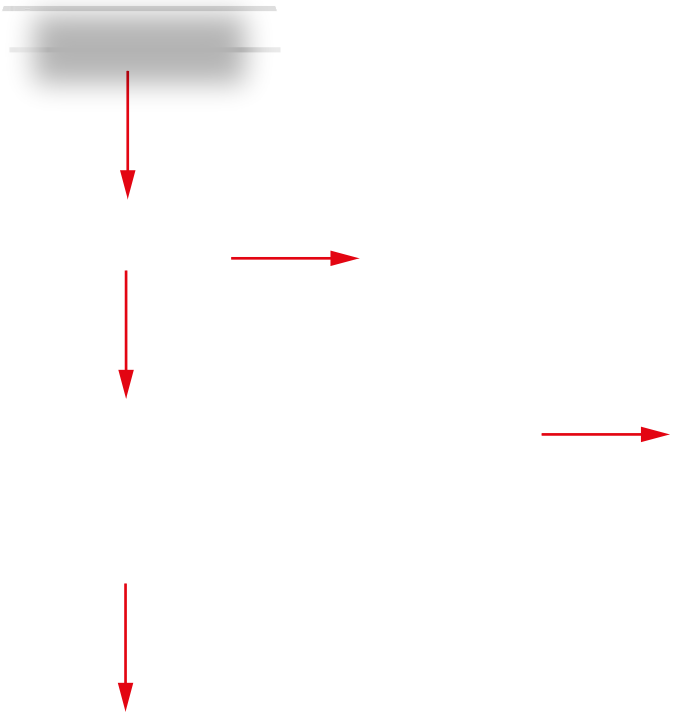
- The results are read:
  - Colourless = negative
  - Yellow = total coliforms present
  - Yellow/fluorescent = faecal coliforms present (tested with a UV lamp).

In order to enumerate the levels of total or faecal coliforms the **M P bab N b (MPN)** method can be applied. In this case:

- The water sample is dispensed into 10 tubes (each of 10ml and containing the reagent);
- The samples are Incubated at 35oC for 24 hours;
- The number of positive tubes (out of ten) is recorded;
- Table 2 is used to determine the most probable coliform concentration.

- If all three samples are negative the water may be deemed safe to drink as it is.
- If any of the samples prove positive, at least three 1ml samples should be tested using PetrifilmTM incubated on the human body for 24 hours. This will determine if the level of contamination is high (>100cfu/100ml). If so, an appropriate water treatment process should be planned.
- If all the PetrifilmTM results are negative, this means there is low level contamination only. The MPN method can then be used with the P/A test to enumerate the contamination levels if more accuracy is required (at least ten 10ml samples should be incubated on the human body for 24 hours). If the MPN method indicates 23 cfu/100ml or above an appropriate water source protection and/or water treatment process should be planned, otherwise the water may be deemed safe to drink as it is.

This process is summarised in Figure 1.



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