

(Primary detection of *Salmonella*, *Citrobacter* and *E. coli* based on H₂S production)

HiMedia has developed ready to use kit for testing potability of drinking water. This kit involves rapid detection of H₂S producers in single step. The kit is easy to handle, reliable and more stable though it matches on similar principle for the detection of hydrogen sulphide enterobacteria by paper strip method initially developed by Dr. Manja et al (1) for water testing method.

Water Sampling Procedure :

- ◆ The source from where water is collected should be in regular use.
- ◆ For Hand Pump sources, before collecting the water, the water should be pumped and wasted for at least 3-5 minutes to clear all dirt, turbidity and slime.
- ◆ Water from the wells should be taken in the middle at mid-depth. For lakes, rivers and dams the water should be collected near the off-take point.
- ◆ The water should be collected after clearing the suspended and floating matter.

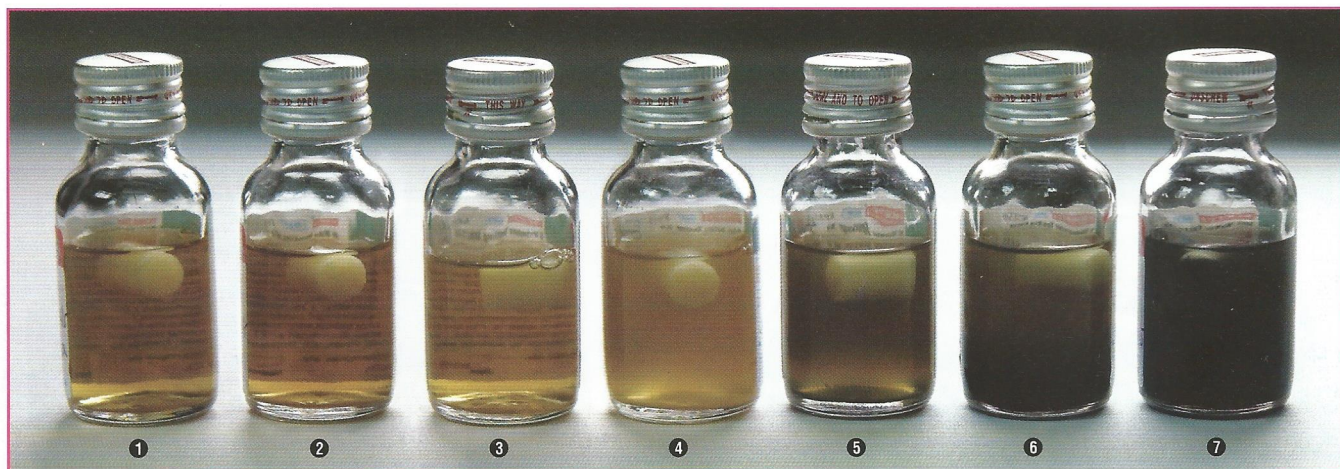
- ◆ Before collection of the sample, the container should be washed/rinsed with the water to be sampled for at least 2-3 times.
- ◆ Note the sample identification number (ID) on the container.
- ◆ The testing of the sample should be completed within 12 hours from the time of collection.
- ◆ Collected water sample should be tested and interpreted for potability of water. (see below & reverse)

Formula :

Required quantity of medium is soaked in rolled filter bud, dried and transferred to glass bottle and sterilized.

Directions :

1. Fill vial with water upto arrow level. Allow to soak the rolled filter bud and if required shake gently. On release of medium from bud, colour of water will change from yellow to brown. Keep at room temperature (30°C)/closed room/pocket or preferably at 35-37°C for 24 to 48 hours.



K055 – HiWater™ Testing Kit (with glass bottles)

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|----------------------------------|--------------------------------|-------------------------|---------------------|----------------------------------|
| 1. Control | 2. <i>E. coli</i> | 3. <i>Ent. faecalis</i> | 4. <i>S. aureus</i> | 5. <i>Salmonella</i> Enteritidis |
| 6. <i>Salmonella</i> Typhimurium | 7. <i>Citrobacter freundii</i> | | | |

K055 – Available in Glass bottles.

K056 – Available in Plastic bottles.

2. Observe for blackening of contents after specified period.
3. If colour turns black, water is not fit for drinking.
4. Add few drops of some disinfectant (i.e. Dettol, phenyl etc.) and discard the bottle. Preferable to autoclave wherever facility is available.

Principle and Interpretation :

It has been reported that human faecal contamination is one of the main causes of water-borne diseases. In 1993, WHO (2) therefore recommended regular testing of drinking water for thermotolerant coliforms and *Salmonella* species to ensure its complete absence. The frequent testing of drinking water in remote areas, as well as in developing countries, is rather difficult to achieve. Townsend, 1992 (3) has demonstrated the lack of correlation between coliform bacteria and the presence of *Salmonella* species in water, particularly in the tropics and subtropics. In Western Australia, 30% of all *Salmonella* isolations from water have occurred in the absence of indicator bacteria (4). Iveson and Fleay 1991 (5), found that 3% of tropical waters tested were contaminated with *Salmonellae* in the absence of *Escherichia coli*. They suggested that the origin of *Salmonellae* may be from faeces of birds and reptiles which did not contain coliform bacteria. The absence of *Escherichia coli* in *Salmonella* contaminated water is more often in the tropics. However, analysis of *Salmonella* using the culture methods is a four stage process involving pre-enrichment, selective enrichment, biochemical identification and confirmation by serological method. Thus, it is a very lengthy process which requires four days for completion. Therefore Manja's (1) method was found most suitable for the detection of *Salmonella* species which uses H₂S Strip. K055/K056, HiWater Testing Kit is based on similar lines for detection of hydrogen sulphide producers.

Quality Control :

Appearance:

Yellowish brown coloured, rolled filter paper bud, containing H₂S Medium.

Colour and Clarity :

Amber coloured, clear solution obtained on addition of water.

Cultural Response :

After 24 to 48 hours observe the presence of growth in the bottles. If colour of the medium changes to black it indicates the presence of *Salmonella* or *Citrobacter* in water, hence indicating that the water is not safe for drinking purpose.

Organisms (ATCC)	Growth	Colour change in Medium	H ₂ S production
<i>E. coli</i> (25922)	good-luxuriant	yellow with haze	—
<i>S. Typhimurium</i> (23564)	good-luxuriant	black	+
<i>C. freundii</i> (8090)	good-luxuriant	black	+
<i>S. Enteritidis</i> (13076)	good-luxuriant	black	+
<i>S. aureus</i> (25923)	inhibited	clear yellowish brown	—
<i>E. faecalis</i> (29212)	inhibited	clear yellowish brown	—

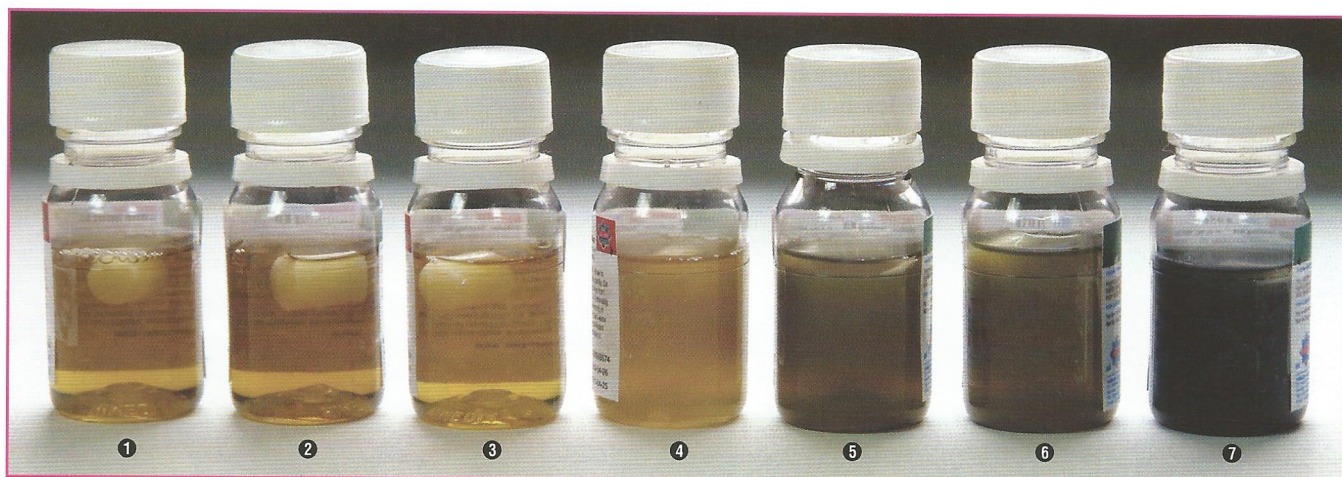
Key : + = positive reaction — = no reaction

References :

1. Manja K.S., Maurya M.S. and Rao K.M., 1982, Bulletin of the World Health Organisation, 60:797-801.
2. WHO, 2006, Guidelines for drinking water quality, Vol. 1 Recommendations, 1st Addendum to 3rd edition.
3. Townsend S.A., 1992, Journal of Appl. Bacteriol. 73:182-188.
4. Peterson D.J., and Schorsch I., 1980, WA Health Surveyor.2 (June). 7-11.
5. Iveson J.B. and Fleay B.J., 1991. Proceedings of the 14th Federal Convention, Australian Water and Wastewater, 2:435-441.

Storage and Shelf-life :

Store below 30°C. It has shelf-life of 2 years.



K056 – HiWater™ Testing Kit (with Plastic bottles)

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