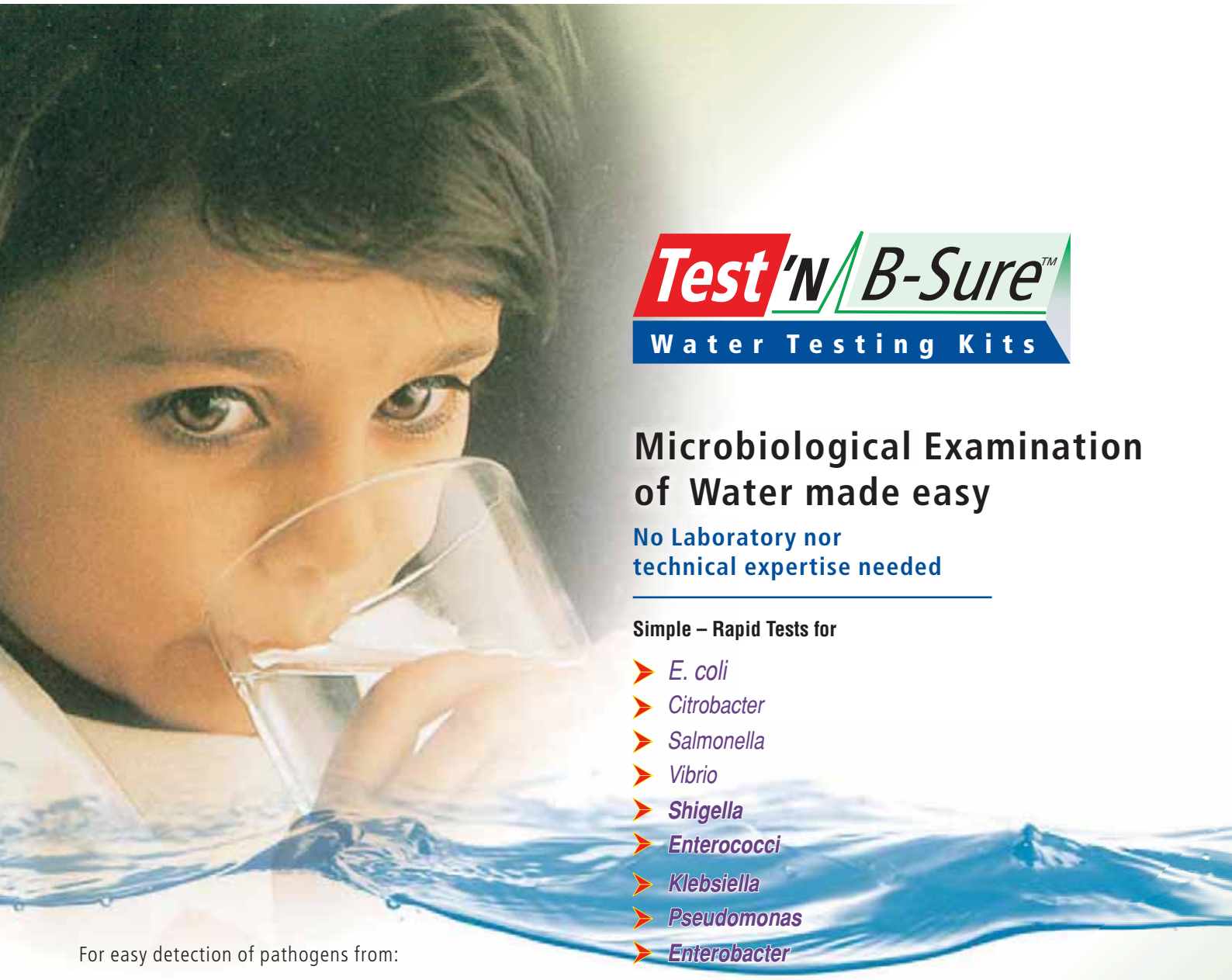

Test 'N B-Sure™

Water Testing Kits

Microbiological Examination of Water made easy

No Laboratory nor technical expertise needed

Simple – Rapid Tests for

- *E. coli*
- *Citrobacter*
- *Salmonella*
- *Vibrio*
- *Shigella*
- *Enterococci*
- *Klebsiella*
- *Pseudomonas*
- *Enterobacter*

For easy detection of pathogens from:

- *Water Treatment Plants*
- *Rural Water Supply Tanks*
- *Lakes and Wells*
- *Rivers and Streams*
- *Housing Societies*
- *Hotels and Hospitals*
- *Office Complexes*
- *Swimming Pools*
- *Bottling Plants*

Complete Solution to Pathogenic Detection in Potable Water & in Bioprocess Water

HiMedia's
Multi Parameter WaterTesting Systems

AquaLab™

Complete Solution to Water Testing

HiMediaLaboratories™
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HIMEDIA®
For life is precious

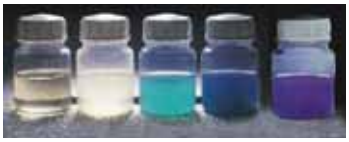
Test'N B-Sure™
Water Testing Kits

AQUA Check™
water analysis system
Simple & Easy

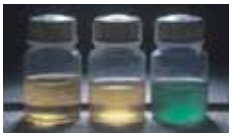
Microbial Examination of Water made easy

MS1186
PA Coliform Kit

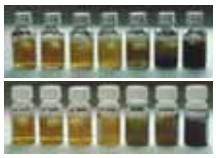
K015
HiWater™ Test Kit



K016
Rapid Hicoliform™ Test Kit



K017
Rapid HiEnterococci™ Test Kit



K055/K056
HiWater™ Testing Kit

K019
H_2S Test Medium (powder)

K020
HiH_2S™ Test Strip, Modified

K022
HiSelective™ H_2S Medium Kit (powder form)

K023
HiSelective™ *E. coli* Test Kit

Typical Aqua Check Test Kit Reagent Bottles

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The word 'HiMedia', the logo of HiMedia as appearing in this booklet, HiMedia Laboratories Pvt. Ltd., HI-MEDIA, Life is precious, For life is precious, Test'N B-Sure, HiWater, HiColiform, AQUA*Check*, HiEnterococci, HiH_2S, HiSelective are Trade Marks owned by HiMedia Laboratories Pvt. Limited, Mumbai, India

Publication : 2009

HIMEDIA®

Water sustains all life on earth. One of the basic elements of the natural environment, water is a consumable item for humans and animals, a primary component for industry and a vector for domestic and industrial pollution. The form in which water exists is greatly affected by presence of dissolved or suspended solid, liquid and gaseous substances, organic matter and micro-organisms. These characteristics of water are an important factor to man who uses the water for drinking or for technical purposes.

The quality and amount of the various constituents actually form the basis for the definition of the quality of water, upon which the adequacy for various uses are determined. In this view testing of the available water is of paramount importance. To determine potability of water, bacteriological and hygienic chemical analysis is necessary. Microbiological examinations of water samples determines its potability and sanitory quality. These methods indicate the degree of contamination with wastes.

HiMedia Laboratories provide Ready Water Testing Kits - Microbial as well as chemical for the speed and accuracy in detection of drinking water potability.

Test & B-Sure range of Microbial Testing Kits adding the easy detection of microbes in potable water. The present literature is also includes a brief overview of chemical analysis using Aqua Kits along with list of conventional bacteriological media available for various pathogen testing in water using HiMedia's Culture Media.

Complete Water Testing

Sample Sources

Water Treatment Plants

Rural Water Supply Tanks

Lakes and Wells

Rivers and Streams

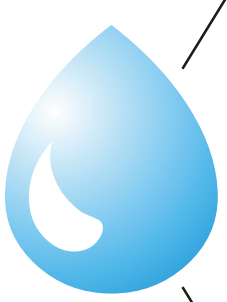
Housing Societies

Hotels and Hospitals

Office Complexes

Swimming Pools

Bottling Plants



Water

Tests for

Microbes

E. coli
Citrobacter
Salmonella
Vibrio
Shigella
Enterococci
Klebsiella
Pseudomonas
Enterobacter

Physical

Turbidity
pH

Chemical

Total Hardness
Alkalinity
Chloride
Sulphite
Silica
Iron
Nitrite
Hydrazine
Free Chlorine
Orthophosphate
Calcium Hardness

Test 'N B-Sure™
Water Testing Kits

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 to be tested and interpreted for potability of water.

PA Coliform Kit MS1186

PA Coliform Kit is recommended for the detection of presence or absence of Coliform bacteria from drinking water, recreational water, water from distribution or treatment plants, water from domestic water tanks.

Procedure :

Collect 100 ml water to be tested in ziplock bag and transfer to a sterile disposable bottle. Add entire quantity of powder medium (PA Broth) slowly to water by swirling to dissolve the powder completely. After dissolution, incubate the bottles for 24 - 48 hours at 30 - 35°C. Observe the colour change of the medium from reddish-purple to yellow, indicating the presence of coliform bacteria.

Quality Control:

Appearance:
Light yellow to greenish yellow coloured, homogeneous, free flowing powder.

Colour and Clarity :
Reddish purple coloured, clear solution, without any precipitate.

Cultural Response :
Cultural characteristics observed after an incubation of 18 – 24 hours at 35 - 37°C.

Oraganism (ATCC)	Growth	Colour of Medium
E. aerogenes (13048)	good-luxuriant	light yellow
E. coli (25922)	good-luxuriant	yellow
E. faecalis (29212)	inhibited	–
K. pneumoniae (13883)	good-luxuriant	yellow
S. Typhimurium (23564)	good-luxuriant	turbid purple
S. Typhimurium (14028)	good-luxuriant	turbid purple

Reference :

Greenberg A. E., Trussel R. R. And Clesceri L. S. (Eds.), 1985, Standard Methods For The Examination of Water and Waste water, 16th ed., APHA, Washington, DC.

Storage and Shelf-life :

Store below 30°C. It has shelf-life of 3 years.

- *PA Coliform Kit, from HiMedia, provides an easy, yet reliable method to ensure, whether water is free from coliform group of bacteria. Bacterial contamination, especially by the coliform group, cause the major water-borne diseases in humans.*
- *An exhausting list of enteric diseases like bloody diarrhoea, dysentery, typhoid, gastroenteritis, paratyphoid and many more are caused by these invisible and harmful coliform bacteria.*
- *The kit can be used anywhere and requires no training or laboratory. The ease to test at an affordable cost makes the kit a handy tool; to be safe from enteric pathogens.*

Direction for use

Clean the hands with soap & water before handling Test 'N B-sure™.


1. Media and sterile bottle


2. Open the bottle with care


3. Pour the contents into sterile bottle


4. Pour water till 100ml mark. Keep in warm place for 18-24 hours.



5. Observe change in colour of liquid.

No change in original violet colour indicates **Water is potable** (safe to use)

Change to yellow colour from violet indicates **Water is not potable** (contaminated with dangerous coliform)

HiWater™ Test Kit K015

HiWater™ Test Kit is devised for rapid and simultaneous detection of *Salmonella* species, *E. coli, Citrobacter* species and *Vibrio* species.

Composition

Medium A : (for detection of *Salmonella* species, *E. coli*, *Citrobacter* species)

Ingredients	Gms/pack
Peptone, special	2.0
Lactose	0.5
Dipotassium hydrogen phosphate	0.15
Ferric ammonium citrate	0.075
Sodium thiosulphate	0.1
Sodium lauryl sulphate	0.01
Bromo cresol purple	0.0005

Medium B : (for detection of *Vibrio* species)

Ingredients	Gms/pack
Peptone, special	1.2
Sucrose	2.0
Sodium thiosulphate	0.65
Sodium citrate	1.0
Bile salt	0.6
Sodium chloride	1.0
Indicator mix	0.06

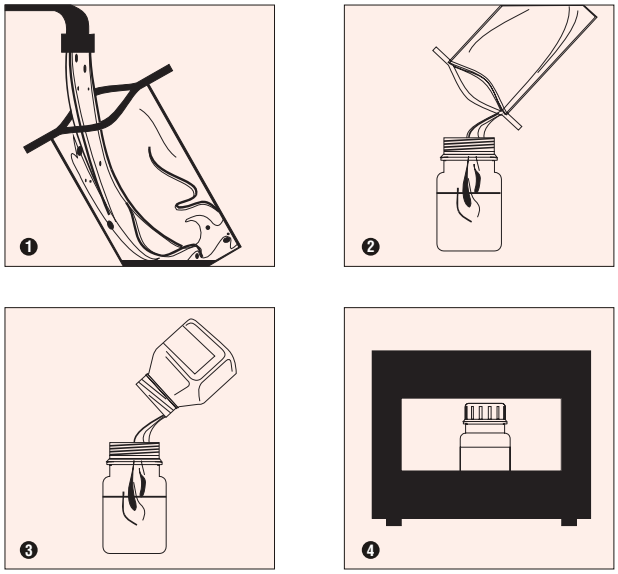
Direction :

Collect 200 ml water to be tested in sterile whirlpak® bag. Transfer 100 ml each to two separate sterile disposable bottles. Add entire quantity of medium A powder slowly to one bottle with 100 ml water. Swirl to dissolve the powder completely. Similarly add entire quantity of medium B powder to another bottle with 100 ml water. Repeat the same procedure for dissolution of powder as specified for medium A. After dissolution, incubate both the bottles for 24-48 hours at 35-37°C.

Principle and interpretation :

Medium A : For *Salmonella, E. coli, Citrobacter* species :

HiWater test kit which is a modification of Manja *et al.* (1), allows the simultaneous detection of *Salmonella, E. coli* and *Citrobacter* species. Differentiation is based on production of



H_2S whereas *E. coli* is identified on the basis of colour change in the medium.

The medium contains peptone as a source of nitrogen. Ferric ammonium citrate and sodium thiosulphate are reduced by certain species of enteric organisms to produce H_2S. Dipotassium hydrogen phosphate provides buffering action and sodium lauryl sulphate inhibits the growth of accompanying microflora. Bromo cresol purple indicates change in the pH of the medium by colour change from reddish-purple to yellow. Lactose fermentors induce acid production leading to lowering of pH and hence the colour change.

Medium B : For *Vibrio* species :

Vibrio broth is a selective medium for *Vibrio cholerae, V. parahaemolyticus* and other *Vibrios.*

Peptone, special provides nitrogen, carbon, sulphur, vitamin B complex and other essential nutrients.

Sodium citrate, bile salt inhibit gram positive organisms and

Medium A : 1. Control 2. *E. coli* 3. *C. freundii* 4. *S.*Typhimurium

Medium B : 1. Control 2. *V. cholerae* 3. *V. parahaemolyticus*

coliforms. Sucrose is the fermentable carbohydrate. Thiosulphate acts as a source of sulphur. The alkaline pH of the medium aids in the recovery of *Vibrio cholerae*.

Quality Control :

Appearance:

Medium A and B : Light yellow coloured, homogeneous, free flowing powder.

Colour and Clarity :

Medium A : Light purple coloured, clear solution.

Medium B : Purple coloured, clear solution.

Cultural Response :

Cultural characteristics observed after an incubation of 18 – 48 hours at 35 - 37°C.

Medium A - for *Salmonella, E. coli, Citrobacter* species

Organism (ATCC)	Colour change	H_2S production
E. coli (25922)	Yellow	—
S. Typhimurium (23564)	Black	+
C. Freundii (8090)	Black	+
S. Enteritidis (13076)	Black	+

Key *:* no colour change (purple colour)

Medium B - For *Vibrio* species

Organism (ATCC)	Colour change
V. cholerae (15748)	dark burgundy
V. parahaemolyticus (17802)	red

References :

1) Manja, K.S., Maurya M.S. and Rao, K.M. 1982, *Bulletin of World Health Organization*. 60(5):797-801.

Storage and Shelf-life :

Store below 30°C. It has shelf-life of 3 years.

Rapid Hicoliform™ Test Kit K016

The Rapid Hicoliform™ Test Kit is used for detection and confirmation of *Escherichia coli* and total coliforms on the basis of enzyme substrate reaction from water samples, using a combination of chromogenic and fluorogenic substrate.

Composition :

Ingredients	Gms/pack
Peptone, special	0.50
Sodium chloride	0.50
Sorbitol	0.1
Dipotassium hydrogen phosphate	0.27
Potassium dihydrogen phosphate	0.2
Sodium lauryl sulphate	0.01
Chromogenic substrate	0.008
Fluorogenic substrate	0.005
Isopropyl-β-D-thiogalactopyranoside (IPTG)	0.01

Direction :

Collect 100 ml water to be tested in sterile whirlpak® bag and transfer to sterile disposable bottle. Add entire quantity of medium by swirling to dissolve the powder completely. After dissolution, incubate the bottle for 24-48 hours at 35-37°C. Observe the colour change of the medium from light yellow to blue green indicating the presence of coliforms and light yellow to fluorescent blue green (under uv) indicating presence of *Escherichia coli*.

Principle and Interpretation :

The rapid Hicoliform™ Test Kit is used for the simultaneous detection of total coliforms and *E. coli*. Peptone, special which is rich in tryptophan content, provides essential growth nutrients and is useful for the simultaneous detection of indole production. The presence of indole can be detected by addition of p-dimethylaminobenzaldehyde indicated by formation of red coloured ring. Sorbitol provides the carbon source. The phosphate salts provide buffering action for rapid growth of coliforms. Sodium lauryl sulphate makes the medium selective by inhibiting accompanying microflora, especially the gram-positive organisms. The fluorogenic substrate, is split by enzyme β-D-glucuronidase, which is specifically found in *E.coli.* The reaction is indicated by a blue fluorescence under UV light. The presence of total coliforms is indicated by a blue-green colour of the broth due to cleavage of chromogenic substrate. IPTG amplifies enzyme synthesis and increases the activity of β-D-galactosidase.

1. Control
2. *S.* Typhimurium (Negative reaction)
3. Total coliforms (Positive reaction)
4. *E. coli* (Positive reaction)
5. *E. coli* Fluorescence under UV (Positive reaction with fluorescence)

Quality Control :

Appearance:

Light yellow to yellowish brown coloured, homogeneous, free flowing powder.

Colour and Clarity :

Light yellow coloured, clear solution.

Cultural Response :

Cultural characteristics observed after an incubation of 24 – 48 hours at 35 - 37°C.

Organism	Colour change in medium	Fluore-scence	Indole reaction
Total coliforms	blue-green*	—	—
E. coli (25922)	blue-green*	+	+
S. Typhimurium (23564)	yellow**	—	—
S. Typhimurium (14028)	yellow**	—	—

Key: *= Positive reaction – colour change to blue green
**= Negative reaction – no colour change (pale yellow)

References :

1. Hahn, G., and Wittrock E. 1991, *Acta Microbiologica Hungarica* 38(3-4):265-271.
2. Manafi. M., and Kneifel, W. 1989. *Zbl. Hygiene and Umweltmedizin* 189:225-234.
3. Manafi, M. 1990. *Forum Stadte-Hygiene* 41:181-184.
4. Manafi, M. 1991. *Ernahrung / Nutrition*, 15, Nr. 10.
5. Manafi, M., and Kneifel, W. 1991, *Acta Microbiologica Hungarica* 38(3-4):293-304.
6. Manafi, M., Kneifel B., and Bascon, S. 1991. *Microbiol. Rev*. 55:335-348.

Storage and Shelf-life :

On receipt store between 2 - 8°C. It has shelf-life of 3 years.

Rapid HiEnterococci™ Test Kit K017

The Rapid HiEnterococci™ Test Kit is used for rapid and easy identification and differentiation of *Enterococci* from water sample. It contains chromogenic substrate, which aids in the detection of *Enterococci* from water sample.

Composition :

Ingredients	Gms/pack
Peptone, special	1.00
Sodium chloride	0.50
Sodium azide	0.03
Chromogenic substrate	0.004
Polysorbate 80	0.20
Disodium dihydrogen phosphate	0.125

Direction :

Collect 100 ml water to be tested in sterile whirlpak® bag and transfer to sterile disposable bottle. Add entire quantity of medium by swirling to dissolve the powder completely. After dissolution, incubate the bottle for 24-48 hours at 35-37°C. Observe the colour change of the medium from light yellow to blue green indicating the presence of *Enterococci*.

Warning: Sodium azide has a tendency to form explosive metal azides with plumbing materials. It is advisable to use enough water to flush off the disposables.

Principle and Interpretation :

The rapid HiEnterococci™ Test Kit allows for rapid identification and differentiation of *Enterococci* from water samples.

The peptone special supplies nitrogenous compounds and sodium chloride provides the osmotic balance for rapid growth of *Enterococci*. Sodium azide inhibits the accompanying microflora, especially the gram negative organisms.

The enzyme β-D-Glucosidase present in *Enterococci* cleaves the chromogenic substrate, resulting in an intensive colour change in the broth to blue green.

Quality Control :

Appearance:

Cream to yellow coloured, homogeneous, free flowing powder.

Colour and Clarity :

Yellow coloured, clear solution.

Cultural Response :

Cultural characteristics observed after an incubation of 24 – 48 hours at 35 - 37°C.

1. Control 2. *E. coli* (Negative reaction) 3. *E. faecalis* (Positive reaction)

Organism (ATCC)	Colour change in medium
E. coli (25922)	slightly (pale) yellow**
E. faecalis (29212)	blue green*

Key : * = Positive – colour change to blue green
** = Negative – no colour change (yellow)

References :

1. Althous, H., Dott, W., Havemeister, G, Muller, H.E, and Sacre',C., 1982, *Zbl. Bakt. Hyg. I. Abt. Orig. A*. 252:154-165.
2. Amoras I, 1995, Poster präsentation congress of Spanish Society of Microbiology, Madrid.
3. Litsky, W., Mallmann, W.L., and Fifield, C.W. 1953, *Amer. J. Pbl. Hlth*. 43:873-879.
4. Manafi M., and Sommer R, 1993, *Wat. Sci. Tech*. 27:271-274.
5. Snyder M.L., and Lichstein, H.C. 1940, *J. Infect. Dis*. 67:113-115.

Storage and Shelf-life :

On receipt store between 2 - 8°C. It has shelf-life of 3 years.

H_2S Test Medium (powder) K019

Bacteriological field-testing kit for drinking water using H_2S test medium.

H_2S Test Medium is recommended for the detection of *Salmonella* species and *Citrobacter* species from water samples.

Formula:

Dehydrated medium powder prepared as per guidelines of DRDO.

Direction:

Fill the bottle with water up to arrow level (20 ml). Allow to dissolve the powder and if required shake gently. Keep at room temperature (preferably at 32-35°C) for 24-48 hours. After incubation if color turns black, water is not fit for drinking.

Note: Add few drops of some disinfectant (i.e. dettol, phenyl etc.) and discard the bottle. Preferable to use the autoclave wherever the facility is available.

Principle and Interpretation:

The importance of clean water for Health has long been recognised. Yet it is still a problem around the world. Human faecal contamination is one of the major reason for water born diseases, global health problem. In 1993, WHO (1) recommended regular monitoring of drinking water for complete absence of thermotollerent coliform and *Salmonella* species. Coliform bacteria may not be adequate as sole indicator of recent faecal contamination. It is studied that there is no co-relation between coliform and presence of *Salmonella* species in water, in tropics (2, 3).

The analysis of *Salmonella* by routine culture method is lengthy process. However K019 – H_2S Test Medium Kit is rapid, portable and reliable field testing kit for drinking water. This medium is prepared as per DRDO formulation. This kit can detect *Salmonella* serotype Typhimurium and *Citrobactor freundii* based on detection of Hydrogen sulphide (4) even in absence of coliform. It is rich in growth factors and nitrogen source. Addition of cysteine makes the medium more sensitive and the test less time consuming for detection of *Salamonella* serotype Typhimurium and *Citrobactor freundii* (5). H_2S test medium is having ferric salts which are reduced by certain species of enteric organisms to H_2S. This medium is having sufficient buffering action and inhibitory effect for growth of gram-positive organisms.

Quality Control:

Appearance:

Light yellow to yellowish brown coloured, homogeneous powder in glass bottles.

Colour and Clarity :

Dark amber coloured clear solution obtained on addition of water up to mark.

Cultural Response :

Cultural characteristics observed after an incubation of 24 – 48 hours at ambient temperature between 25°C to 44°C.

1. Control 2. *S.* Typhimurium 3. *C. freundii*

Oraganism (ATCC)	Growth	H_2S production
C. freundii (8090)	luxuriant	+
S. Typhimurium (23564)	luxuriant	+

Key : + = positive, blackening of the medium

References:

1. WHO, 2006, Guidelines for drinking water quality, Vol. 1 Recommendations, 1st Addendum to 3rd edition.
2. Townsend S.A., 1992, The relationships between *Salmonellas* and faecal indicator bacteria concentrations in two pools in the Australia wet / dry tropics. Journal of Appl. Bacteriol. 73:182-188.
3. Peterson D.J., and Schorsch I., 1980, The microbiological surveillance of drinking water in Western Australia. WA Health Surveyor.2 (June). 7-11.
4. Manja K.S., Maurya M.S. and Rao K.M., 1982, A simple field test for the detection of faecal pollution in drinking water. Bulletin of the World Health Organisation, 60:797-801.
5. Sobsey M.D. and Pfaender F.K. Evaluation of the H2S Method for Detection of Faecal contamination of Drinking water, Geneva.

Storage and Shelf-life :

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

HiH_2S^{TM} Test Strip, Modified K020

H_2S Test Strip, Modified is devised for simultaneous detection of *Salmonella, Vibrio, Citrobacter* species and *Escherichia coli*.

Formula :

The medium for detection of hydrogen sulphide producers is soaked on rolled filter paper.

Direction :

Fill the bottle with water upto arrow level. Allow to soak the rolled filter paper strip and shake gently. Keep at room temperature (30°C) or preferably at 35-37°C for 16-48 hours. If required to further verify the presence of *E. coli*, it is recommended to add 5-10 drops of Kovac's Indole Reagent (R008) to the bottles, after incubation.

Note: Add few drops of some disinfectant (i.e. dettol, phenyl etc.) and discard the bottle. Preferable to use the autoclave wherever the 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 *Escherichai 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 is most suitable for the detection of *Salmonella* species which uses H_2S Strip. Ferric salts in the medium is reduced by certain species of enteric organisms to produce H_2S. In presence of oxygen, some bacteria are able to split tryptophan into indole and alpha amino propionic acid. Indole reaction can be detected by adding p-dimethylaminobenzaldehyde indicated by formation of a red coloured ring.

Quality Control:

Appearance:

Yellowish brown coloured, filter paper strip containing medium.

1. Control 2. *Salmonella* species / *C. freundii* 3. *E. coli*

Colour and Clarity :

Amber coloured, clear solution obtained on addition of water.

Cultural Response :

Cultural characteristics observed after an incubation at 35-37°C for 16 - 48 hours.

Oraganism (ATCC)	Growth	Colour of Medium	H_2S production	Indole production
E. coli (25922)	luxuriant	yellow with haze	–	+
S. Typhimurium (23564)	luxuriant	black	+	–
C. freundii (8090)	luxuriant	black	+	–
S. Enteritidis *(13076)*	luxuriant	black	+	–

Key : + = positive reaction – = negative reaction

Reference :

1. Manja K.S., Maurya M.S. and Rao K.M., 1982, A simple field test for the detection of faecal pollution in drinking water. Bulletin of the World Health Organization, 60:797-801.
2. WHO, 2006, Guidelines for drinking water quality, Vol. 1 Recommendations, 1st Addendum to 3rd edition.
3. Townsend S.A., 1992, The relationships between *Salmonellas* and faecal indicator bacteria concentrations in two pools in the Australia wet / dry tropics. Journal of Appl. Bacteriol. 73:182-188.
4. Peterson D.J., and Schorsch I., 1980, The microbiological surveillance of drinking water in Western Australia. WA Health Surveyor. 2 (June). 7-11.
5. Iveson J.B. and Fleay B.J., 1991, Serovars of *Salmonella* isolated from humans, animals, waters and effluents in natural and disturbed environments in Western Australia. 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.

HiSelective™ H_2S Medium Kit (powder form) K022

H_2S Test Medium is recommended for the simultaneous detection of *Salmonella, Vibrio, Citrobacter* species and *Escherichia coli* from water samples.

Introduction :

Supplies of drinking water contaminated with sewage or other excreted matter from man and animals may cause diseases like typhoid fever, cholera, campylobacteriosis, amoebiasis and helminthiasis. In the interests of public health, drinking water supplies should be tested to confirm the absence of contamination. Trying to detect the presence of all the different types of water-borne pathogens is laborious and impractical. A practical approach is to test the supply for the presence of faecal indicator bacteria.

The significance of various coliform organisms in water has been and is a subject of considerable study. Collectively, the coliforms are referred to as indicator organisms. The genera *Enterobacter, Klebsiella, Citrobacter* and *Escherichia* usually are represented in the majority of isolations made from raw and treated municipal water supplies.

One purpose of drinking water and wastewater treatment is to reduce the numbers of viable organisms to acceptable levels and to remove or inactivate all pathogens causing human disease. Water contamination and disease transmission may result from over-loaded sanitary waste disposal and potable water treatment systems. Outbreaks of gastroenteritis, pharyngo-conjunctivitis, folliculitis, otitis and pneumonia are associated with recreational activities like swimming, boating etc. Environmental Microbiological examinations are conducted to monitor compliance of the environment, to trouble shoot problems in treatment plants and distribution systems and in support of epidemiological investigations of disease outbreaks.

Kit contains sterile bottles with powder medium. Fill 20 ml of test water sample in the bottle, and incubate.

1. Control
2. *E. coli*
3. *Vibrio* species
4. *Shigella* species
5. *Streptococcus* species
6. *Enterobacter* species
7. *Pseudomona* species
8. *Klebsiella* species
9. *Salmonella* species
10. *Citrobacter* species

HiSelective™ H_2S Medium Kit (powder form) – K022

Systematic Diagram

① K022 HiSelective™ H_2S Medium Kit (Powder form)

② Open the box and remove a bottle for testing

③ Remove the seal and loosen the cap by unscrewing in the anticlockwise direction

④ Remove the cap

⑤ Fill the bottle with water sample upto the arrow mark

⑥ Incubate the bottle at 32 - 35°C for 24 - 48 hours

After incubation medium colour remains bluish green with no haziness and no blackening

WATER IS POTABLE

1. *E. coli*
2. *Vibrio* species
3. *Shigella* species
4. *Streptococcus* species
5. *Enterobacter* species
6. *Pseudomonas* species
7. *Klebsiella* species
8. *Salmonella* species
9. *Citrobacter* species

WATER IS NOT POTABLE

Principle and Interpretation :

HiSelective H_2S Medium is a modification of the medium developed by Manja et al (1) for the simultaneous detection of *Salmonella, Vibrio, Citrobacter* species and *Escherichia coli* from water samples.

It has been reported that human faecal contamination is one of the main causes of water-borne diseases. In 1993, WHO (2) has 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. *Salmonella* species associated with enteric fevers and other diseases are usually present in small numbers, compared to coliforms. *Vibrio cholerae* is the causative agent of cholera which is potentially a fatal diarrheal disease. *Citrobacter freundii* is often confused with *Escherichia* and *Salmonella*, however it is hydrogen sulphide positive unlike *Escherichia* and lacks the pathogenicity of *Salmonella*. 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). 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 at least four days for completion. This kit provides faster results, in just 24 hours. Incubation upto 48 hours may be required before discarding negative bottles.

The medium contains casein enzymic hydrolysate which is a source of nitrogen. Ferric ammonium citrate and sodium thiosulphate are reduced by certain species of enteric organisms to produce H_2S, which turns medium black. The indicator mix in the medium is very sensitive to pH changes caused due to fermentation of sucrose. Bile salt inhibits the growth of accompanying microflora.

Directions :

- Fill vial with water upto arrow level. Swirl to dissolve the powder completely. Incubate at 35-37°C for 24-48 hours.
- Observe for turbidity with or without change of colour of the medium.
- If medium shows turbidity with blue / bluish purple or black colour, water is not fit for drinking. Black colour with turbidity of medium indicates presence of *Salmonella* or *Citrobacter* species, bluish green colour of medium with turbidity indicates *Escherichia coli*, bluish purple colour with turbidity indicates *Vibrio* species and dark purple colour with turbidity indicate presence of *Klebsiella* species.
- Add few drops of some disinfectant (i.e. Dettol, phenyl etc.) and discard the vial. Preferable to use the autoclave wherever the facility is available.

Quality Control :

Appearance of powder :

Light yellow to pink coloured, homogeneous, free flowing powder.

Appearance of solution :

Bluish green coloured, clear solution.

Cultural Response :

Cultural response is observed after an incubation at 35 - 37°C for 24 - 48 hours .

Control vial : Bluish green coloured, clear solution.

Organisms (ATCC)	Appearance of Medium following incubation	Colour appearance after growth
Klebsiella species	dark purple with turbidity	
Escherichia coli (25922)	bluish green with turbidity	
Enterobacter species	dark purple with turbidity	
Shigella species	bluish green with turbidity	
Citrobacter species	black with turbidity	
Streptococcus species	bluish green with turbidity	
Vibrio species	bluish purple with turbidity	
Pseudomonas species	bluish green with turbidity	
Salmonella species	black with turbidity	

References :

1. Manja K.S., Maurya M.S. and Rao K.M., 1982, A simple field test for the detection of faecal pollution in drinking water. 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, The relationships between *Salmonella* and faecal indicator bacteria concentrations in two pools in the Australia wet / dry tropics. Journal of Appl. Bacteriol. 73:182-188.
4. Peterson D.J., and Schorsch I., 1980, The microbiological surveillance of drinking water in Western Australia. WA Health Surveyor. 2 (June), 7-11.

Storage and Shelf-life :

Store below 30°C. It has shelf-life of 3 years.

HiSelective™ *E. coli* Test Kit K023

HiSelective™ *E. coli* Test Kit is recommended for the rapid detection and confirmation of *Escherichia coli* based on enzyme-substrate reaction from water samples.

Introduction :

The procedures for microbiological examinations of water samples to determine sanitary quality includes test for detection and enumeration of indicator organisms. The coliform group of bacteria, especially *Escherichia coli* is the principle indicator. Various methods for the differentiation of the coliform group are included in standard procedures. Such differentiation however is of limited value in assessing drinking water quality because the presence of any coliform bacteria renders the water potentially unsatisfactory and unsafe. Thus the detection of *Escherichia coli* in water samples provide qualitative appraising of the sanitary quality of water and the effectiveness of treatment process.

Tests for *Escherichia coli* are applicable for the analysis of drinking water, surface and ground water and waste water. *Escherichia coli* is a member of the indigenous fecal flora of warm-blooded animals. The occurrence of *Escherichia coli* is considered a specific indicator of fecal contamination and the possible presence of enteric pathogens.

Principle and Interpretation :

HiSelective™ *E. Coli* Test Kit is used for detection and differentiation of *Escherichia coli*. It is based on principle of Tryptone Bile Agar used for detection of *Escherichia coli* in foods (1) where recovery of *Escherichia coli* is faster, more reliable and accurate.

The medium contains chromogenic mixture which helps to detect glucuronidase activity of *Escherichia coli* (2). This specific enzyme differentiates *Escherichia coli* from other coliforms. *Escherichia coli* cells split the chromogenic mixture with the help of glucuronidase to give blue colour to the medium. Coliforms other than *Escherichia coli* turns media red due to presence of indicator. Thus, the resulting colour distinction allows simple interpretation of test without further confirmation. Casein enzymic hydrolysate provide the essential growth nutrients to the organisms. Bile salts inhibit gram-positive organisms.

Directions :

- Collect 100 ml water to be tested in sterile disposable bottle.
- Add entire quantity of medium by swirling to dissolve the powder completely.
- After dissolution, incubate the bottle for 24-48 hours at 35-37°C.
- Observe the colour change of the medium from light yellow to blue indicating the presence of *Escherichia coli*. Coliforms other than *Escherichia coli* give red colour due to presence of indicator.

Quality Control :

Appearance of Powder :

Light yellow to pink coloured, homogeneous, free flowing powder.

Colour and Clarity :

Light yellow to pink coloured, clear solution.

Cultural Response :

Cultural characteristics observed after an incubation at 35 - 37°C for 18 - 24 hours.

Organisms (ATCC)	Growth	Colour of Medium
Escherichia coli (25922)	luxuriant	blue
Enterobacter aerogenes (13048)	luxuriant	red
S. aureus (25923)	inhibited	–

References :

1. Anderson J. M. and Baird Parker A.C., 1975, J. Appl. Bact., 39:111.
2. Hansen W. and Yourassawsky E., 1984, J. Clin. Microbiol., 20:1177.

Storage and Shelf-life :

On receipt store between 2 - 8°C. It has shelf-life of 3 years.

1. Control 2. *E. coli* 3. *Kleb. pneumoniae*

Test 'N B-Sure Water Testing Kit K051

Test 'N B - Sure Water Testing Kit is recommended for simultaneous detection of *Escherichia coli*, Coliforms, *Salmonella* species, and *Citrobacter* species from water sample.

Composition**:

Ingredients	Grams/Litre
Tryptone	5.00
Brain heart infusion	5.00
HiVeg infusion	5.00
Yeast extract	2.00
Sodium thiosulphate	1.00
Dipotassium hydrogen phosphate	1.50
Ferrous sulphate	0.30
Lactose	5.00
Bromocresol purple	0.02
Magnesium sulphate	1.00
Sodium chloride	5.00
Trehalose	5.00

Final pH (at 25°C) 7.0 ± 0.2

**Formula adjusted, standardized to suit performance parameters

Direction:

Suspend 3.5 grams of powder in 100 ml water sample to be tested Allow to dissolved the powder and if required shake gently. Dispense in sterile test tubes. Incubate at 35-37°C for 24 - 48 hours. After incubation add 1 ml of Kovac's Indole Reagent (R008).

Principle and Interpretation:

It has been reported that human faecal contamination is one of the main causes of water-borne diseases. In 1993, WHO (1) therefore recommends regular testing of drinking water for thermotolerant coliforms and *Salmonella* species to ensure their complete absence. The frequent testing of drinking water in remote areas, as well as in developing countries, is rather difficult to achieve. Townsend, 1992 (2) has demonstrated the lack of correlation between coliform bacterial 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 (3). Iveson and Fleay 1991 (4), found that 3% of tropical waters tested contaminated *Salmonellae* in the absence of *Escherichai coli*. *Escherichia coli* is a member of faecal coliform group of bacteria. It is a member of the indigenous faecal flora of warm-blooded animals. *E. coli* is considered a specific indicator of faecal contamination and the possible presence of enteric pathogens. Indole is produced in this medium by organisms that possess the enzyme tryptophanase. Tryptophanase degrades typtophan present in tryptone , yielding indole. It can be detected in the medium by adding Kovacs' reagent. Indole combines with the *p*-dimethylaminobenzaldehyde of Kovac,s reagent and produces a red complex (Red ring at the top).

Quality Control:

Appearance:

Yellow to yellowish brown coloured, homogeneous free flowing powder.

Colour and Clarity:

Purple coloured, clear solution obtained on addition of water.

Cultural Response:

Cultural characteristics observed after an incubation at 35 - 37°C for 18 - 24 hours.

Oraganism (ATCC)	Growth	Colour of Medium	H_2S Production	Indole * Production
Escherichia coli (25922)	good-luxuriant	yellow w/haze	–	+
Salmonella Typhimurium *(14028)*	good- luxuriant	purple w/black precipitate	+	–
Citrobacter freundii (8090)	good- luxuriant	black colour throughout the medium	+	–
Vibrio cholerae (15748)	good-luxuriant	purple w/haze	–	–
Shigella flexneri(12022	good-luxuriant	purple w/haze	–	–

Key : + = positive reaction – = negative reaction

* = On addition of Kovac's Indole Reagent (R008)

1. Control 2. *E. coli* 3. *S. aureus* 4. *Salmonella* Typhi 5. *Salmonella* Typhimurium
6. *C. freundii* 7. *Ent. faecalis* 8. *Kleb. pneumoniae* 9. *Shigella flexneri*

Reference :

1. WHO, 1993, Guidelines for drinking water quality, Vol. 1 Recommendations, Second edition.

2. Townsend S.A., 1992, The relationships between *Salmonellas* and faecal indicator bacteria concentrations in two pools in the Australia wet / dry tropics. Journal of Application Bacteriol. 73:182-188.

3. Peterson D.J., And Schorsch I., 1980, The microbiological surveillance of drinking water in Western Australia. WA Health Surveyor. 2 (June). 7-11.

4. Iveson J.B. and Fleay B.J., (1991). Serovars of *Salmonella* isolated from humans, animals, waters and effluents in natural and disturbed environments in Western Australia. 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.

HiWater™ Testing Kit K055 / K056

(Primary detection of *Salmonella, Citrobacter* and *E. coli* based on H_2S production)

HiMedia has developed ready to use kit for testing potability of drinking water. This kit involves rapid detection of H_2S 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 eneterobacteria by paper strip method initially developed by Dr. Manja et al (1) for water testing method.

Water Sampling Procedure :

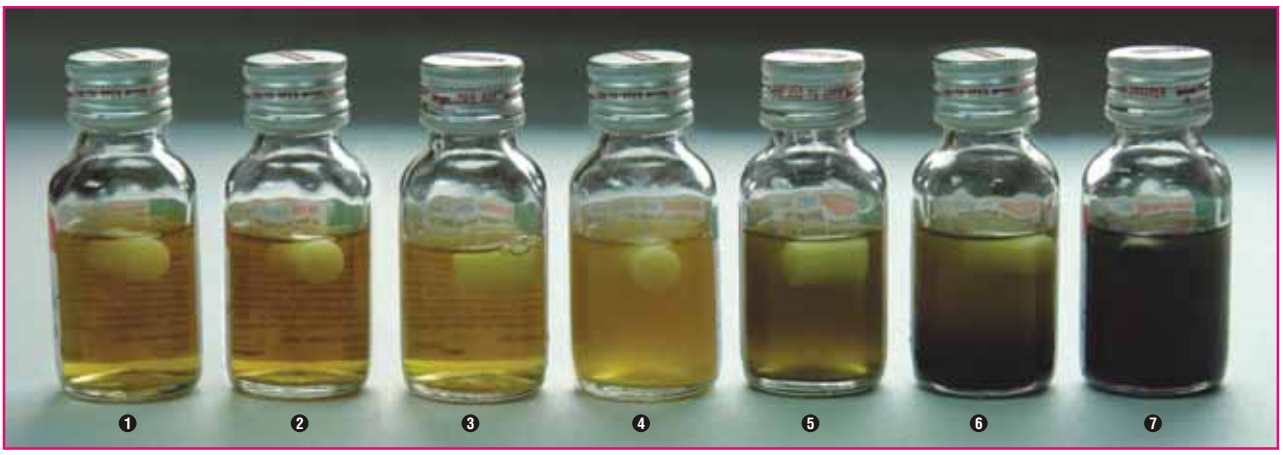
- The source from where water is collected should be in regular use.
- For Hand Pump sources, before collecting the water, the water should be pumped and wasted for at least 3-5 minutes to clear all dirt, turbidity and slime.
- Water from the wells should be taken in the middle at mid-depth. For lakes, 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)

1. Control
2. *E. coli*
3. *Ent. faecalis*
4. *S. aureus*
5. *Salmonella* Enteritidis
6. *Salmonella* Typhimurium
7. *Citrobacter freundii*

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 H_2S 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 H_2S 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_2S production
E. coli (25922)	good-luxuriant	yellow with haze	–
S. Typhimurium (23564)	good-luxuriant	black	+
C. freundii (8090)	good-luxuriant	black	+
S. Enteritidis (13076)	good-luxuriant	black	+
S. aureus (25923)	inhibited	clear yellowish brown	–
E. faecalis (29212)	inhibited	clear yellowish brown	–

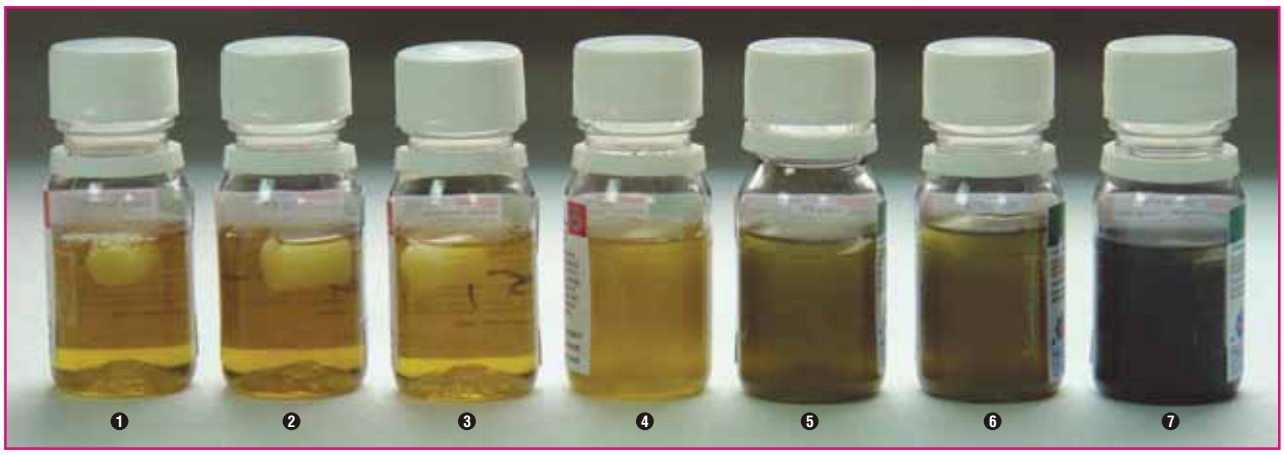
Key : + = positive reaction – = no reaction

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)

1. Control 2. *S. aureus* 3. *Ent. faecalis* 4. *E. coli* 5. *Salmonella* Enteritidis
6. *Salmonella* Typhimurium 7. *C. freundii*

KO55 – Available in **Glass bottles.**

KO56 – Available in **Plastic bottles.**

Chemical Analysis of Water

Conventional water analysis necessitates need for a full - fledged analytical laboratory which may not be available in the vicinity. Also Laboratory analysis is time consuming and expensive. Hence to ease these problems HiMedia introduces AquaCheck Water Analysis System. AquaCheck System includes readymade, user-friendly analytical test systems for extended chemical analysis of waters. AquaCheck System includes specific reagents for volumetric and colorimetric analysis. These reagents are substitutes for colorimetric methods, which are costly and are not portable and hence cannot be used on site. AquaCheck System provides visual colour standards for comparison of the developed colour.

AquaCheck system is simple, accurate and saves time, labour and costs. Salient features of AquaCheck System are :

- More accurate, reliable and rapid test System.
- Less expensive, no instrumentation required.
- Easily handled and interpreted by non-technical personnel.
- Packing made sturdy for field use.
- Reagents are reliable and stable with long shelf life.
- Refill packs of reagents available.

The following are different tests which can be conducted by the AquaCheck System range and their salient features.

Tests available
Total Hardness
Calcium Hardness
Alkalinity
Chloride
Sulphite
Free Chlorine
Nitrite
Orthophosphate
Silica
Iron
Hydrazine
Nitrate
Total dissolved solids(TDS)
Electrical Conductivity (EC)

Total Hardness

Total hardness of water in current practice is defined as the sum of calcium and magnesium concentrations both expressed as calcium carbonate, in mg/liter. These salts precipitate to form scale on pipes in boilers, cooling tower, heat exchange equipment and form poor lather with soap.

Hardness is especially undesirable in the machine tool industry, poultry and in boilers, as it interferes with the working of essential additives required for the process. e.g. the oral chick vaccine in poultry, cutting oils/ coolants in the machine tool industry. Hardness is monitored in industrial waters to check scaling potential of water, determine cycles of concentration and the efficacy of the treatment program.

Titrimetric methods are commonly used in the laboratory for the estimation of total hardness. The test sample is titrated with a standard chelate in the presence of an indicator. The hardness end point is signalled by a colour change from red to blue. Calcium hardness is estimated by a different test. Magnesium hardness is derived by the difference between the total and calcium hardness. The Aquacheck Total Hardness System is a quick and easy test for measuring hardness in water. This test is useful for boiler and cooling waters, softeners, building industries, poultry, aquaculture etc.

The system contains dispenser bottles, precisely calibrated which give consistent and accurate results for the estimation of total hardness.

Calcium Hardness

The calcium hardness in water determines the scaling potential of water. The difference between Total Hardness and Calcium Hardness gives the Magnesium Hardness. Calcium analysis is usually carried out for boiler water, cooling water, softener water (Inlet and Outlet), distilled water, demineralized water and potable water.

Total Alkalinity

Total alkalinity of a water is its acid-neutralizing capacity. It is the sum of all the titrable bases. The alkalinity in water is generally imparted by the salts of carbonates, bicarbonates, and hydroxyl ions in free state. This again determines the scaling potential of water. Alkalinity is significant in determining the suitability of water for irrigation. Alkalinity measurements are used in the interpretation and control of water and waste water treatment processes.

Chloride

Chloride, in the form of chloride (Cl) ion, is one of the major inorganic anions in water and waste water. The chloride content in water is estimated to ascertain the corrosion in the

system. The cycles of concentration are also calculated by analyzing chloride.

Free Chlorine

Chlorine is not a natural constituent of water. It is universally used for the disinfection of water especially for large volumes. Chlorine being an oxidizing biocide eliminates almost all microbial species. It controls slime, disease causing bacteria and algae in water. It is used for all kinds of waters e.g. drinking, cooling water, swimming, effluent treated water, etc. For effective disinfecting, a residual level of chlorine is to be maintained in water systems.

The "AquaCheck Chlorine Test System" is a quick and an easy test for free chlorine in water. Since chlorine residuals are required to be monitored regularly, this easy test helps to monitor chlorine quickly and accurately, especially at site.

Sulphite

Oxygen present in water leads to corrosion of the boiler metal. Sodium sulphite is added to low pressure boilers to remove dissolved oxygen. The residual sulphite content in water is generally determined in low pressure boilers to ensure oxygen scavenging which indirectly controls corrosion.

Nitrite

Nitrite is good corrosion inhibitor for closed systems. Nitrite levels in close recirculating cooling systems and cooling engines are estimated by this Aqua Check System.

Reactive Silica

Silica is the natural constituent of water. Silica forms glassy deposits/ scale over heating surfaces. These deposits are hard and hamper heat transfer. Silica levels are monitored in the water to minimize scaling.

Iron

Some ground water and acid surface drainage contain considerable amount of iron. This analysis of the iron content in the water gives the idea about corrosive nature of water. Soluble iron present in waters of boilers and cooling systems can be analysed to monitor corrosion inhibitor treatment programme. Potable water can be checked to control iron level in water. Iron in water can cause staining of laundry and porcelain.

Orthophosphate

Phosphate is externally added to water to control scale and corrosion during treatment. Monitoring of phosphate levels in water helps to maintain water quality.

Hydrazine

Oxygen present in water, leads to corrosion of the boiler metal. Hydrazine hydrate is added to high pressure boilers to remove dissolved oxygen. The residual Hydrazine level in water is generally determined in high pressure boiler to ensure oxygen scavenging.

Fluoride

Fluoride is frequently encountered in minerals and in geochemical deposits and is generally released into subsoil water sources by slow natural degradation of fluorine contained in rocks. A higher concentration of fluoride causes serious health hazards such as dental, skeletal and nonskeletal fluorosis. Potable water can be checked to control fluoride level in water.

Nitrate

The concentration of nitrates is commonly expressed as NO_3^- The term 'nitrate nitrogen" is used to refer to the nitrogen present which is combined in the nitrate ion. Nitrate nitrogen can result from the seepage of water through soil containing nitrate bearing minerals. It may also occur as a result of using certain fertilizers in the soil, however nitrates are one of the products of decomposition of animal and human wastes.Thus the presence of minerals in water supply indicates possible pollution of the water.

Electrical Conductivity (EC)

It is a measure of ability to conduct electricity. Its units are Siemens per meter (s/m) in SI and milli mhos per centimeter (mmhos/cm) in U.S.

Total Dissolved Solids (TDS)

It is a measure of the total Ions in solution. The unit is parts per million (ppm). The values for EC and TDS are related to each other and can be converted with an accuracy of about 10% using the following equation. TDS (mg/l) OR ppm = 640 x EC (ds/m). EC and TDS can be measured by using Electrical conductivity meter and TDS meter (pocket size) by simply dipping into water sample.

Chemical Testing

AquaCheck Water Analysis System

Comprehensive Lab-Free Qualitative and Quantitative Chemical Water Testing in Separate Kits

WT001A to 1F	Total Hardness Testing Kit
WT002, 2A	Calcium Hardness Testing Kit
WT003, 3A	Alkalinity Testing Kit
WT004, 4A	Chloride Testing Kit
WT005, 5A	Sulphite Testing Kit
WT006	Free Chlorine Testing Kit
WT007, 7A	Nitrite Testing Kit
WT008A, 8B	Orthophosphate Testing Kit
WT009	Silica Testing Kit
WT010	Iron Testing Kit
WT011	Hydrazine Testing Kit
WT012	Fluoride Testing Kit
WT013	Nitrate Testing Kit
WT025	Arsenic Testing Kit

AQUA*Check*™
water analysis system
Simple & Easy

Total Hardness Test

Kit contains 4 reagent bottles and 1 test jar with spoon
Least Count of one drop : 2 & 5 mg/L

Code	Product	Type	Range	No. of Tests
WT001D-1NO **WT001A-1NO**	**AQUA*Check* Total Hardness Testing Kit** (Calcium and Magnesium Content)	Drop titration	2-40 mg/L, 5-100 mg/L as $CaCO_3$	**100 Tests** **300 Tests**
WT001E-1NO **WT001B-1NO**	**AQUA*Check* Total Hardness Testing Kit** (Calcium and Magnesium Content)	Drop titration	2-40 mg/L, 25-500 mg/L as $CaCO_3$	**100 Tests** **300 Tests**
WT001F-1NO **WT001C-1NO**	**AQUA*Check* Total Hardness Testing Kit** (Calcium and Magnesium Content)	Drop titration	5-100 mg/L, 25-500 mg/L as $CaCO_3$	**100 Tests** **300 Tests**

Calcium Hardness Test

Code	Product	Type	Range	No. of Tests
WT002A-1NO **WT002-1NO**	**AQUA*Check* Calcium Hardness** Testing Kit Kit contains 4 reagent bottles and 1 test jar with spoon	Drop titration	5-100 mg/L as $CaCO_3$	**100 Tests** **250 Tests**

Alkalinity Test

Code	Product	Type	Range	No. of Tests
WT003A-1NO **WT003-1NO**	**AQUA*Check* Alkalinity Testing Kit** Kit contains 4 reagent bottles and 1 test jar with spoon	Drop titration	10-200 mg/L, 100-2000 mg/L, Alkalinity as $CaCO_3$	**100 Tests** **300 Tests**

Chloride Test

Code	Product	Type	Range	No. of Tests
WT004A-1NO **WT004-1NO**	**AQUA*Check* Chloride Testing Kit** Kit contains 4 reagent bottles and 1 test jar with spoon	Drop titration	10-200 mg/L, 50-1000 mg/L as chloride	**100 Tests** **300 Tests**

Sulphite Test

Code	Product	Type	Range	No. of Tests
WT005A-1NO **WT005-1NO**	**AQUA*Check* Sulphite Testing Kit** Kit contains 4 reagent bottles and 1 test jar with spoon	Drop titration	5-100 mg/L as Na_2SO_3	**100 Tests** **250 Tests**

Free Chlorine Test (New version)

Code	Product	Type	Range	No. of Tests
WT006-1NO	**AQUA*Check* Free Chlorine Testing Kit** ▼ Kit contains 3 reagent bottles and 1 test jar	Drop titration	0.1-3 mg/L as Chlorine	**100 Tests**

▼ : 3 months shelf life

Nitrite Test

Code	Product	Type	Range	No. of Tests
WT007A-1NO **WT007-1NO**	**AQUA*Check* Nitrite Testing Kit** Kit contains 3 reagent bottles and 1 test jar	Drop titration	5-100 mg/L, 50-1000 mg/L as $NaNO_2$	**100 Tests** **250 Tests**

Orthophosphate Test

Code	Product	Type	Range	No. of Tests
WT008A-1NO	**AQUA*Check* Orthophosphate Testing Kit** Kit contains 3 reagent bottles*, 1 test jar with spoon and colour chart*	Comparator	0-40 mg/L as PO_4	**100 Tests**
WT008B-1NO	**AQUA*Check* Orthophosphate Testing Kit** Kit contains 3 reagent bottles*, 1 test jar with spoon and colour chart*	Comparator	0.5-10 mg/L as PO_4	**100 Tests**

* Available individually

AQUACheck™ water analysis system Simple & Easy

AQUACheck

PRECURE-350
Each Tablet
to treat 100 Liters of Water

PRECURE-1000
Each Tablet
to treat 1000 Liters of Water

NaDCC Tablets
Each Tablet
to treat 2500 Liters of Water

Silica Test

Code	Product	Type	Range	No. of Tests
WT009-1NO	**AQUA*Check* Silica Testing Kit** Kit contains 3 reagent bottles*, 1 test jar with spoon and colour chart*	Comparator	10-80 mg/L as SiO_2	100 Tests

* Available individually

Iron Test (New version)

Code	Product	Type	Range	No. of Tests
WT010-1NO	**AQUA*Check* Iron Testing Kit** Kit contains 1 powder reagent bottles*, 1 test jar with spoon and colour chart*	Comparator	0.3-2.0 mg/L as Fe	100 Tests

* Available individually

Hydrazine Test

Code	Product	Type	Range	No. of Tests
WT011-1NO	**AQUA*Check* Hydrazine Testing Kit** Kit contains 1 powder reagent bottles*, 1 test jar with spoon and colour chart*	Comparator	0.1-0.75 mg/L as Hydrazine	100 Tests

* Available individually

Fluoride Test (New version)

Code	Product	Type	Range	No. of Tests
WT012-1NO	**AQUA*Check* Fluoride Testing Kit** Kit contains 2 Reagent Bottles,1 Test jar & colour comparator chart	Comparator	0.0-2.5 mg/L (ppm) as Fluoride	100 Tests

Nitrate test (New version)

Code	Product	Type	Range	No. of Tests
WT013-1NO	**AQUA*Check* Nitrate Testing Kit** Kit contains 1 powder Reagent Bottles,1 Test jar with spoon & colour Comparator chart	Comparator	0.0-100 mg/L(ppm) as Nitrate (NO_3) - N	100 Tests

Arsenic Test Kit

Code	Product	Type	Range	No. of Tests
WT025-1NO	**Arsenic Test Kit** Kit contains 2 Reagent bottles with 2 spoon, 1 Reaction vessel, Container with 50 test strips & colour chart	Comparator	0.5-3.0 mg/L(ppm) as As	50 Tests

TDS Meter

Code	Product	Type	Range	No. of Tests
WT018-1NO	**AQUA*Check* TDS meter for Water testing** Kit contains TDS meter	Visual	0-9990mg/L (ppm)	1 no

Multi Parameter Water Testing Kits

Code	Product	No. of Tests
WT015-1NO	**AQUA*Check* Multi Parameter Water Testing Kit** Kit contains 18 Reagent bottles, 6 Test jars with spoon, 2 Empty bottles, 2 Turbidity measuring tubes, pH strips & 4 tubes, Comparator charts for Iron, Chlorine, Fluoride & Nitrate Tests.	100 Tests
WT023-1NO	**Octo Aqua Test Kit (Water Testing Kit for 8 Test parameters)** Kit contains 19 Reagent bottles, 1 Test jar with spoon, 4 standard turbidity vials & 1 sample vial, pH strips, colour chart for Fluoride, Iron and Nitrate Tests.	100 Tests

Test & Range	Type
1) pH test : pH test strips of range 2.0-10.5	Visual
2) Turbidity : standards of 0, 5, 10 & 25 NTU	Visual
3) Chloride : 10-200 mg/L(ppm) and 50-1000mg/L(ppm) as Cl	Drop titration
4) Total hardness : 25-600 mg/L(ppm) as $CaCO_3$	Drop titration

Test & Range	Type
5) Fluoride : 0.0-2.5 mg/L (ppm) as F	Comparator
6) Iron : 0.0-2.0 mg/L(ppm) as Fe	Comparator
7) Nitrate : 0.0-100 mg/L(ppm) as Nitrate (N)	Comparator
8) Residual (Free) chlorine : 0.0-3.0 mg/L(ppm)	Drop titration

Water Purification Tablets

Code	Product	Packing
WT019-1NO	**Precure – 350** (Contains 350 mg NaDCC*, each tablet to treat 100 litres of water)	1x1000 no
WT020-1NO	**Precure–1000** (Contains 3.5 gm NaDCC*, each tablet to treat 1000 litres of water)	1x150 no
WT021-1NO	**Sodium Dichloroisocyanurate Tablets** (Contains 8.68 gm NaDCC*, each tablet to treat 2500 litres of water)	1x50 no

* NaDCC : Sodium Dichloroisocyanurate

Emergency Drinking Water Germicidal Tablets

Code	Product	Packing
WT026-1NO	**HiAqua Pure with HA Plus** Kit contains 2 bottles, each bottle having 50 tablets to treat 25 litres of water	1 no

Chemical Testing

AQUA Check
water analysis system
Simple & Easy

Multi Parameter Water Testing Kit - WT015

Comprehensive Lab-Free Qualitative and Quantitative Chemical Water Testing in a Single Kit

- Fluoride • Nitrate • Iron • Residual (Free) chlorine
- Chloride • Total hardness • Turbidity test • pH test

Bureau of Indian standards have set the requirements for essential and desirable characteristics to be tested for ascertaining the suitability of water in IS 10500-1991.

WT015 offered by HiMedia is a Multiparameter water testing kit determining levels of fluoride, nitrate, iron , residual (free) chlorine, chloride and total hardness besides measuring turbidity and pH.

Kit contents :

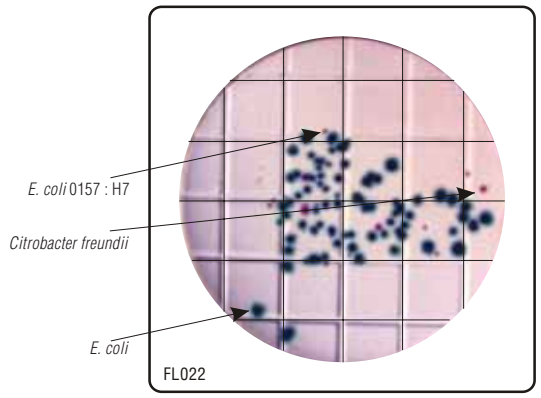
Type of test	Range
Fluoride	0.0-5.0 mg/L (ppm) as Fluoride
Nitrate	0.0-250 mg/L (ppm)as Nitrate (NO_3)
Iron	0.0 - 2.0 mg/L (ppm) as Iron
Residual (Free) chlorine	0.0-3.0 mg/L (ppm) as free chlorine
Chloride	10-200 mg/L (ppm) and 50-1000 mg/L (ppm) as Chloride
Total hardness	25-600 mg/L (ppm) as $CaCO_3$
Turbidity test	10-500 NTU, standards of 10 & 25 NTU
pH test	pH test strips of range 6.5 to 9.0.

Microbial Testing

Test 'N B-Sure™ Water Testing Kits

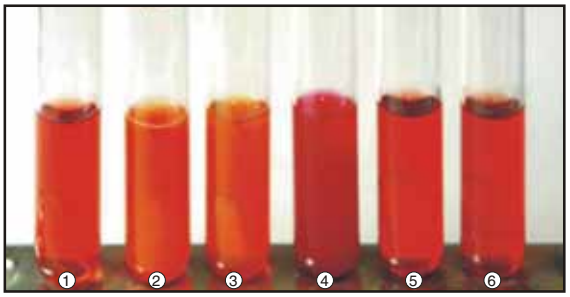
Typical Tests Employed for Water Testing

Convenient and Easy Touch Plates



HiTouch *E. coli* Coliform Count *Flexi* Plate - FL022

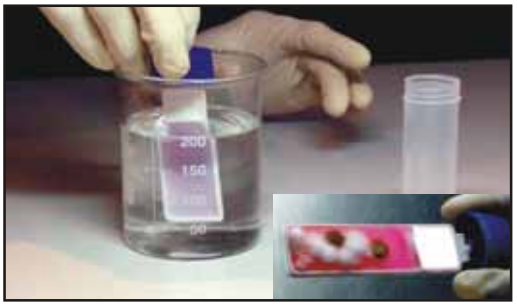
Baird - Parker Agar - M043
Staphylococcus aureus (ATCC 6538)



Mac Conkey Broth - M007

1. Uninoculated control
2. *Escherichia coli* (ATCC 25922)
3. *Enterobacter aerogenes* (ATCC 13048)
4. *Klebsiella pneumoniae* (ATCC 13883)
5. *Staphylococcus aureus* (ATCC 25923)
6. *Enterococcus faecalis* (ATCC 29212)

Hi-Dip Slides for Lab-Free Testing



Rose Bengal Agar - HD008
fungal growth observed

Comparative list of APHA vis a vis HiMedia products for water analysis

APHA Name	HiMedia Code	HiMedia Name
A-1 Medium	M874	A-1 Broth
Acetamide Broth	M148	Acetamide Broth (Twin Pack)
Asparagine Broth	M672	Asparagine Broth
Azide Dextrose Broth	M345	Azide Dextrose Broth
Baird Parker Agar	M043	Baird Parker Agar Base
	FD046	Egg Yolk Tellurite Emulsion
	FD045	Egg Yolk Emulsion
	FD047	Potassium Tellurite 3.5%
	FD069	B P Sulpha Supplement
	FD195	Fibrinogen Plasma Trypsin Inhibitor Supplement
Bile Esculin Agar	M972	Bile Esculin Agar
Bismuth Sulphite Agar (Wilson Blair Medium)	M027	Bismuth Sulphite Agar
Brain Heart Infusion	M210	Brain Heart Infusion Broth
Brain Heart Infusion Agar	M211	Brain Heart Infusion Agar
Brilliant Green Agar	M016	Brilliant Green Agar Base, Modified
	FD068	Sulpha Supplement
	M016A	Brilliant Green Agar Base w/ 1.2% Agar
Brilliant Green Lactose Bile Broth	M121	Brilliant Green Bile Broth 2%
Buffered Glucose Broth	M070	Buffered Glucose Broth
BCYE Agar	M813	Buffered Charcoal Yeast Extract Agar Base
	FD040	Legionella Selective Supplement IV (MWY)
	FD041	Legionella Supplement
Butzler's Medium	M144	Columbia Blood Agar Base
	FD007	Campylobacter Supplement - II (Butzler)
Casitone Glycerol Yeast Autolysate Broth	M381	Casitone Glycerol Yeast Autolysate Broth Base (CGY)
Czapek Dox Agar	M075	Czapek Dox Agar
Decarboxylase Test Media (Falkow)	M912	Decarboxylase Test Medium Base (Falkow)
Decarboxylase Test Media (Moeller)	M393	Decarboxylase Broth Base, Moeller
Deoxycholate Citrate Agar	M065	Deoxycholate Citrate Agar
Diamalt Agar	M438	Diamalt Agar
EC Medium	M127	EC Broth
EMB Agar	M317	EMB Agar
Hektoen Enteric Agar	M467	Hektoen Enteric Agar
Iron Oxidizing Medium *(Thiobacillus ferroxidans)*	M615	Iron Oxidizing Medium (for *Thiobacillus ferroxidans*) (Twin pack)
Isolation Medium (Iron Bacteria)	M622	Isolation Medium For Iron Bacteria
KF Streptococcal Agar	M248	KF Streptococcal Agar Base
	FD057	TTC Solution 1%
	FD093	Bromo Cresol Purple
Koser Citrate Broth	M069	Koser Citrate Medium
Lactose Broth	M026	Fluid Lactose Medium
Lauryl Tryptose Broth	M080	Lauryl Sulphate Broth (Lauryl Tryptose Broth)
LES Endo Agar	M1106	M-Endo Agar LES
Levine's EMB Agar	M022	EMB Agar, Levine
Lipovitellin Salt Mannitol Agar	M627	Lipovitellin Salt Mannitol Agar Base
M-Bismuth Sulphite Broth	M1101	M-Bismuth Sulphite Broth
M - Endo Medium	M1103	M-Endo Broth MF (MF Endo Medium) (M-Coliform Broth)

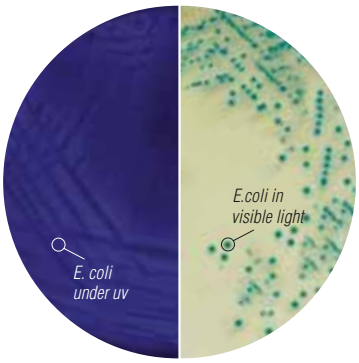
Comparative list of APHA vis a vis HiMedia products for water analysis

APHA Name	HiMedia Code	HiMedia Name
M-Enterococcus Agar	M1108	M-Enterococcus Agar Base
M-FC Broth	M1111	M-FC Broth Base
M-FC Medium	M1122	M-FC Agar Base
	FD058	Rosolic Acid
M-HPC Agar	M1123	M-(HPC)Heterotrophic Plate Count Agar Base
M-PA Agar	M1121	M-PA Agar Base
M-7hFC Agar	M635	M 7 Hr FC Agar
M-Staphylococcus Broth	M1120	M-Staphylococcus Broth
M-Tetrathionate Broth	M1115	M-Tetrathionate Broth Base
MacConkey Agar	M081B	MacConkey Agar w/1.35% Agar, CV, NaCl & 0.15% Bile Salts
MacConkey Broth	M083	MacConkey Broth Purple
Maintenance (SCY) Medium	M777	Maintenance (SCY) Medium
Malonate Broth	M779	Malonate Broth, Ewing Modified
Milk Agar (Brown and Scott-Foster Modification)	M782	Milk Agar (Brown and Scott Modified)(Twin Pack)
Mineral Modified Glutamate Medium	M643	Mineral Modified Glutamate Medium Base (Double Strength) (Twin pack)
Mn Agar	M771	Mn Agar Base
Modified MacConkey Agar (MCIC Agar)	M051	MacConkey Agar,Modified
Modified M-FC Agar	M1124	M-FC Agar Modified for *Klebsiella*
	FD058	Rosolic Acid
Motility Test Medium	M260	Motility Test Medium
	M930	Motility Test Medium (Edwards and Ewing)
Nutrient Agar	M561	Nutrient Agar, pH 6.8
PA Broth	M1186	PA Broth
Pfizer Selective Enterococcus (PSE) Agar	M787	Pfizer Selective Enterococcus Agar
Plate Count Agar (Tryptone Glucose Yeast Agar)	M091	Plate Count Agar (Standard Methods Agar)
R-2A Agar	M962	R-2A Agar
SIM Medium	M181	SIM Medium
SS Agar	M108	SS Agar (Salmonella Shigella Agar)
Selenite Cystine Broth	M025	Fluid Selenite Cystine Medium (Selenite Cystine Medium)
Simmons Citrate Agar	M099	Simmons Citrate Agar
Starch Casein Agar	M801	Starch Casein Agar
Sulphate Reducing Medium *(Thiobacillus thioparus)*	M800	Sulphate Reducing Medium (Twin Pack)
Sulphate Reducing Medium	M803	Sulphate Reducing Medium (Triple Pack)
Sulphur Medium	M559	Sulphur Medium (Twin Pack)
TCBS Agar	M189	TCBS Agar
Tetrathionate Broth	M032	Fluid Tetrathionate Medium w/o Iodine & BG (Tetrathionate Broth Base w/o Iodine & BG)
Tryptic(ase) Soy Broth	M011	Tryptone Soya Broth (Soyabean Casein Digest Medium)
Tryptone Glucose Extract Agar	M791	Tryptone Glucose Beef Extract Agar (TGB Agar)
Tryptophane Broth	M463	Tryptone Broth (Tryptone Water)(1% Tryptone)
TSI Medium	M021	Triple Sugar Iron Agar
Xylose Lysine Brilliant Green Agar	M336	Xylose Lysine Agar Base
Xylose Lysine Deoxycholate Agar	M031	Xylose Lysine Deoxycholate Agar (XLD Agar)
Yeast Extract Malt Extract Glucose Agar	M424	Yeast Malt Agar (YM Agar)

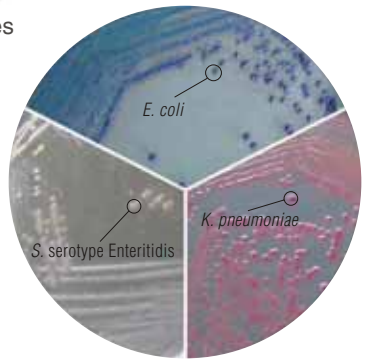
HiCrome™

Single Streak Rapid Differentiation Series

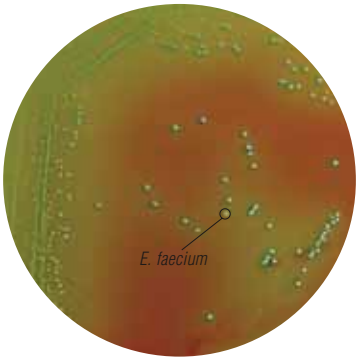
HiCrome Media for Water Testing



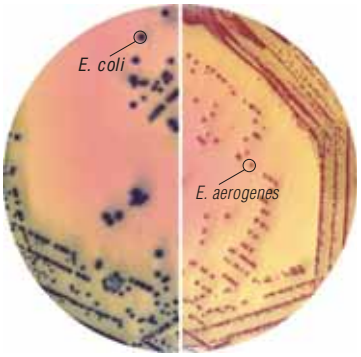
M1488 - HiCrome ECD Agar w/ MUG
For detection of *Escherichia coli*
using chromogenic and fluorogenic substrate



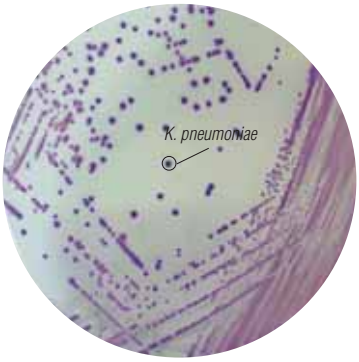
M1300 - HiCrome Coliform Agar w/SLS
For simultaneous detection of
Escherichia coli and total coliforms



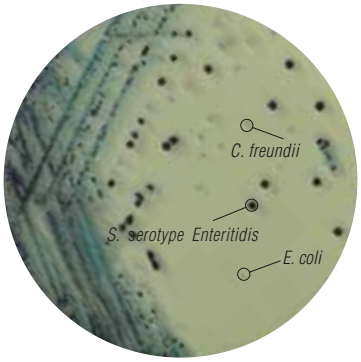
M1580 – HiCrome Enterococcus faecium Agar Base
For chromogenic differentiation of *Enterococcus faecium*



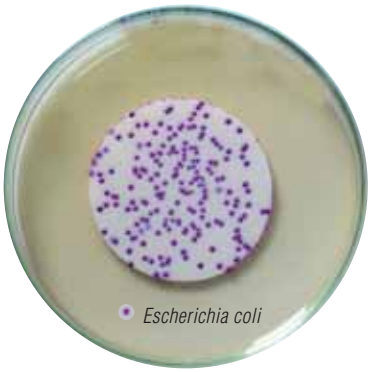
M1294 – HiCrome ECC Selective Agar base
For detection of *Escherichia coli* and coliforms



M1573 - HiCrome Klebsiella Selective Agar Base
For detection of *Klebsiella* species



M1393 - HiCrome MM Agar
For identification and differentiation of
Salmonella and non Salmonella like *Citrobacter*



M1571 – HiCrome M-TEC Agar
For detection of thermotolerant *Escherichia coli* in water by
the membrane filtration technique.

HiMediaLaboratories™

HiMedia Laboratories Pvt. Limited

HIMEDIA®

For life is precious

Literature code: TL071_03/water testing/1209

Innovation
begins
with the
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Complete Solution to
Water Testing

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