Presence-Absence (P-A) Broth

Double-Strength Differential Broth for Presumptive Coliform Detection in Drinking Water

Catalogue Number: AS-1334

Application	Medium Type	Typical pH	HS Code
Drinking-water coliform detection	Double-strength differential broth	6.8 ± 0.2 at 25 °C	3821.00.00

Overview

Presence-Absence (P-A) Broth is the simplest and most widely accepted single-tube method for the presumptive detection of total coliforms and *Escherichia coli* in 100 mL drinking water samples. It is officially approved under US EPA 40 CFR 141.21 and recognised as an alternative procedure in APHA Standard Methods 9221 B, and has been in continuous use for drinking-water compliance testing since the 1980s.

The medium is formulated at double strength so that when combined with an equal volume (100 mL) of water sample, it achieves single-strength nutrient concentrations. Lactose fermentation by coliforms produces acid — detected by yellow colour via bromocresol purple indicator — and gas captured in an inverted Durham tube. Sodium lauryl sulfate and bile salts provide selective inhibition of Gram-positive and non-coliform organisms.

Principle of the Medium

Lactose	Fermentable carbon source selectively utilised by coliforms — produces acid and gas as fermentation products
Bromocresol Purple	pH indicator: purple at neutral pH (negative) → yellow on acid production (positive presumptive result)
Durham Tube	Inverted tube captures gas produced during lactose fermentation — ≥10% fill indicates positive
Sodium Lauryl Sulfate	Selective inhibitor — suppresses Gram-positive organisms and non-coliform bacteria
Phosphate Buffer	Dipotassium and monopotassium phosphate maintain stable pH throughout incubation
Double-Strength Formulation	71.82 g/L — diluted 1:1 with 100 mL water sample to achieve single-strength working concentration

PRODUCT DESCRIPTION

AS-1334 | Presence-Absence (P-A) Broth

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Typical Composition (per litre — double-strength stock)

Ingredient	Amount (g/L)	Function
Tryptose / Lactose Broth base	35.6	Nitrogen and carbon source; supports coliform growth
Lactose	10.0	Fermentable sugar → acid + gas by coliforms
Sodium Chloride	10.0	Osmotic balance
Dipotassium Phosphate (K_2HPO_4)	5.5	Alkaline phosphate buffer component
Monopotassium Phosphate (KH_2PO_4)	5.5	Acidic phosphate buffer component
Sodium Lauryl Sulfate	0.2	Selective inhibitor of Gram-positives and non-coliforms
Bromocresol Purple	0.02	pH indicator: purple (negative) → yellow (positive)

Total (double-strength): 71.82 g/L | Working concentration (after 1:1 dilution with sample): 35.91 g/L | Final pH: 6.8 ± 0.2 at 25 °C

Key Features

- Single-tube, 100 mL presence/absence test — simple pass/fail result, no enumeration required
- Double-strength formulation (71.82 g/L) — diluted 1:1 with water sample to achieve single-strength
- Bromocresol purple pH indicator — clear purple (negative) → yellow (acid positive) colour change
- Durham tube gas detection — ≥10% gas accumulation signals coliform fermentation
- Selective inhibition — sodium lauryl sulfate suppresses non-coliforms and Gram-positives
- US EPA 40 CFR 141.21 approved — compliant for drinking-water regulatory monitoring
- APHA Standard Methods 9221 B — recognised alternative to MPN multi-tube method
- Field-adaptable — ideal for small labs, remote locations, and routine monitoring programmes

Applications

Drinking Water Microbiology

- Regulatory compliance monitoring — drinking water quality programmes
- Presumptive total coliform detection in 100 mL water samples
- Presumptive E. coli detection — confirmed by EC-MUG or indole subculture
- Small water supply monitoring — suitable for remote and field laboratory settings

Environmental & Industrial Water Testing

- Recreational water and groundwater coliform screening
- Process water and cooling water monitoring
- Food and beverage production water quality control

Preparation Instructions

Step 1 — Prepare double-strength stock:

1. Dissolve 71.82 g of dehydrated P-A Broth in 1 litre of purified water with agitation.
2. Place an inverted Durham tube in each 200–250 mL wide-mouth reagent bottle.
3. Dispense 100 mL double-strength broth per bottle. Ensure Durham tube is fully submerged.
4. Autoclave at 121 °C for exactly 12 minutes. Do NOT exceed 12 minutes — over-autoclaving degrades lauryl sulfate and lactose.
5. Cool and inspect: broth should be clear and purple; Durham tube free of air bubbles.
6. Store at 2–8 °C protected from light. Use within 3 months.

Step 2 — Test procedure:

7. Neutralise residual chlorine in water sample: add 0.1 mL of 3% sodium thiosulfate per 100 mL before collection.
8. Aseptically add 100 mL of water sample to one prepared bottle.
9. Incubate at 35 ± 0.5 °C. Read at 24 h and again at 48 h.

Result Interpretation

Observation at 24–48 h	Result	Action
Turbidity + yellow colour + gas (≥10% Durham tube)	POSITIVE	Confirm by EC-MUG or BGB + indole (APHA 9221 F)
Turbidity + yellow colour (no gas)	POSITIVE (presumptive)	Proceed to confirmatory subculture
Clear broth, purple colour, no gas	NEGATIVE	Record as absent in 100 mL
Turbidity only; no colour change	SUSPECT	Subculture and investigate; possible non-coliform

Storage & Stability

Dehydrated powder	15–30 °C in a dry, tightly sealed original container
Prepared bottles	2–8 °C, protected from light, use within 3 months
Shelf life (powder)	As per labelled expiry date (typically 3 years from manufacture)
Do not use if	Turbidity or colour change present in prepared bottle before sample addition

Important Warnings

FOR LABORATORY USE ONLY — Drinking-water microbiology only. Water samples may contain pathogenic organisms. Handle all inoculated bottles in accordance with applicable Biosafety Level (BSL) requirements. Autoclave all used media at 121 °C for 30 minutes before disposal. This is a PRESUMPTIVE test only — all positive results must be confirmed by approved subculture procedures.

Quality & Compliance

Manufactured under controlled conditions for batch-to-batch consistency. Performance tested against ATCC reference organisms prior to release. Compliant with US EPA 40 CFR 141.21 and APHA Standard Methods 9221 B for drinking-water microbiology.

Customs & Trade Information

HS / AHECC Code	3821.00.00
Description	Prepared culture media for the development or maintenance of microorganisms
Country of Origin	Australia

Disclaimer

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