Fluid Thioglycollate Medium (FTM)

Multi-Purpose Enriched Reducing Medium for Aerobic, Microaerophilic, and Anaerobic Cultivation

Catalogue Number: AS-1233

Application	Regulatory	Typical pH	HS Code
Aerobic & anaerobic culture	USP <71> / BP / EP 2.6.1	7.1 ± 0.2 at 25 °C	3821.00.00

Overview

Fluid Thioglycollate Medium (FTM), also known as Thioglycollate Broth or Fluid Thioglycollate Broth, is a multi-purpose enriched liquid medium developed for the simultaneous cultivation of aerobic, microaerophilic, facultative anaerobic, and obligate anaerobic microorganisms. Unlike the Brewer Modified formulation (AS-1364), FTM contains a higher dextrose concentration (5.5 g/L vs 2.5 g/L) and a slightly higher agar content (0.75 g/L vs 0.5 g/L), creating a more defined oxygen gradient and supporting a broader range of organisms including fastidious clinical isolates and pharmaceutical contaminant organisms.

Sodium thioglycollate and L-cystine act as dual reducing agents to lower the oxidation-reduction potential (Eh) throughout the medium, while resazurin provides a visual indicator of oxygen penetration — pink at the surface (aerobic zone), colourless in the lower anaerobic zone. The low agar concentration (0.75 g/L) maintains fluid consistency for easy pipetting and subculturing, while the semi-solid state retards convection to preserve the oxygen gradient.

FTM is a standard pharmacopoeial medium validated for pharmaceutical sterility testing per **USP <71>**, **BP 2023**, and **EP 2.6.1**. It also complies with FDA-BAM, APHA, and ISO 21149 protocols for pharmaceutical, cosmetic, and food microbiology applications.

Comparison — FTM (AS-1233) vs Brewer Modified (AS-1364)

Parameter	FTM AS-1233	Brewer Modified AS-1364
Dextrose	5.5 g/L	2.5 g/L
Agar (semi-solid)	0.75 g/L	0.5 g/L
Sodium Thioglycollate	0.5 g/L	0.5 g/L
L-Cystine	0.5 g/L	0.5 g/L
Resazurin	0.001 g/L	0.001 g/L

NaCl	2.5 g/L	5.0 g/L
pH	7.1 ± 0.2	7.1 ± 0.2
Pharmacopoeial standard	USP <71>, BP, EP 2.6.1	USP <71>, BP, EP 2.6.1
Best use	Pharmaceutical sterility testing; broad-spectrum clinical	Routine anaerobic enrichment; Brewer-specific protocols

Principle of the Medium

Pancreatic Digest of Casein (15.0 g/L)	Rich source of peptides, amino acids, and nitrogen for fastidious organisms
Yeast Extract (5.0 g/L)	B-group vitamins, nucleotides, coenzymes, and growth factors
Dextrose / D-Glucose (5.5 g/L)	Carbon and energy source; supports rapid growth of anaerobic fermenters; mild reductant
L-Cystine (0.5 g/L)	Secondary reducing agent; sulfur source for cystine-requiring anaerobes
Sodium Chloride (2.5 g/L)	Osmotic balance — lower than Brewer Modified for broader organism compatibility
Sodium Thioglycollate (0.5 g/L)	Primary reducing agent — scavenges O_2, lowers Eh to anaerobic range
Agar (0.75 g/L)	Semi-solid — retards convection; maintains O_2 gradient; allows positional growth interpretation
Resazurin (0.001 g/L)	Redox indicator — pink (aerobic/oxidised) → colourless (anaerobic/reduced)

Typical Composition (per litre)

Ingredient	CAS Number	Function	Amount (g/L)
Pancreatic Digest of Casein	73049-73-7	Nitrogen, peptides, amino acids	15.0
Yeast Extract	8013-01-2	Vitamins, growth factors, nucleotides	5.0
Dextrose (D-Glucose)	50-99-7	Carbon/energy source, mild reductant	5.5
L-Cystine	56-89-3	Secondary reducing agent, sulfur source	0.5

Sodium Chloride	7647-14-5	Osmotic balance	2.5
Sodium Thioglycollate	367-51-1	Primary reducing agent — O_2 scavenger	0.5
Agar (semi-solid)	9002-18-0	Oxygen gradient maintenance	0.75
Resazurin (sodium salt)	62758-13-8	Redox indicator (colorimetric)	0.001
Purified Water	7732-18-5	Solvent	q.s. 1 L

Total (without water): ~29.25 g/L | Final pH: 7.1 ± 0.2 at 25 °C

Key Features

- Broad-spectrum versatility — simultaneous support of obligate aerobes, microaerophiles, facultative and obligate anaerobes
- Dual reducing system — sodium thioglycollate + L-cystine provides robust, sustained anaerobic environment
- Resazurin redox indicator — visual real-time monitoring of oxygen penetration depth
- Semi-solid agar (0.75 g/L) — maintains fluid consistency for easy pipetting and subculture while preserving oxygen gradient
- Pharmacopoeial-grade — validated per USP <71>, BP 2023, EP 2.6.1 for pharmaceutical sterility testing
- Complies with FDA-BAM, APHA, and ISO 21149 for cosmetic, food, and pharmaceutical microbiology
- Compatible with CO_2 incubation for capnophilic organisms
- >90% recovery of ATCC reference strains including C. sporogenes and S. aureus

Applications

Pharmaceutical Sterility Testing

- Sterility testing of parenterals, ophthalmics, and medical devices per USP <71>, BP 2023, EP 2.6.1
- Both direct inoculation and membrane filtration sterility testing methods
- Sterility testing of biologics, vaccines, and blood products
- Regulatory sterility testing — FDA, TGA, EMA compliant applications

Clinical Microbiology

- Cultivation and enrichment of obligate anaerobes from clinical wounds, abscesses, and blood
- Blood culture enrichment and detection of septicaemia-causing bacteria
- Enrichment of Clostridium perfringens, Bacteroides fragilis, and other clinical anaerobes
- Fastidious organism enrichment from respiratory, gastrointestinal, and genital specimens

Food, Cosmetic & Environmental

- Enumeration of total viable aerobes and anaerobes in cosmetics (ISO 21149)
- Dairy and food product microbiological testing (APHA)
- Environmental and water sample anaerobe screening

Preparation Instructions

1. Suspend 29.25 g of dehydrated medium in 1 litre of purified water.
2. Heat with frequent agitation to near boiling until completely dissolved. Do not overheat.
3. Dispense into tubes, flasks, or bottles as required (10–20 mL per tube for sterility testing).
4. Autoclave at 121 °C for 15 minutes with caps loosened.
5. Cool to room temperature (approximately 25 °C) and tighten caps.
6. If more than 30% of the medium turns pink (oxidation), reheat once in a boiling water bath (100 °C) for 4 minutes and cool rapidly without shaking.
7. The prepared medium should appear light straw-coloured, clear, and fluid without precipitate.

CRITICAL — Pharmacopoeial sterility testing: Use only medium that is colourless or at most faintly pink in the upper layer (≤30% depth). Discard tubes where >30% is pink. Follow all pharmacopoeial preparation, filtration, and validation requirements for USP <71>, BP, and EP 2.6.1.

Incubation & Growth Pattern Interpretation

Incubation conditions:

Temperature	35–37 °C (clinical/pharmaceutical); 20–25 °C (fungi, yeast — USP <71> requires both temperatures)
Duration	14 days (USP/BP/EP sterility testing); 18–24 h (routine screening); 5–7 days (slow anaerobes)
Atmosphere	Ambient (no special atmosphere required for this medium)
CO_2 incubation	Compatible for capnophilic organisms (Haemophilus, Neisseria, Campylobacter)

Growth pattern interpretation:

Observation	Organism Type	Significance

Turbidity throughout tube uniformly	Facultative anaerobes	Grow with or without oxygen (e.g. Staphylococcus, Enterobacteriaceae)
Turbidity at bottom only — clear upper zone	Obligate anaerobes	Strict anaerobes (e.g. Clostridium, Bacteroides, Fusobacterium)
Turbidity at surface — pellicle formation	Obligate aerobes	Require oxygen (e.g. Pseudomonas, Bacillus)
Turbidity in middle zone	Microaerophiles	Prefer reduced O_2 (e.g. Campylobacter, Helicobacter)
Pink colour >30% from surface	Oxygen penetration	Discard — reheat once and re-evaluate
No turbidity after 14 days (pharma)	Sterile	Pass — document per pharmacopoeial requirements
Any turbidity after 14 days (pharma)	Not sterile	Fail — investigate, identify organism, report

Quality Control — Reference Organisms

Organism	ATCC No.	Expected Result	Pharmacopoeial Ref.
Clostridium sporogenes	11437	Growth — lower zone turbidity (obligate anaerobe)	USP <71> / EP 2.6.1
Staphylococcus aureus	6538	Growth throughout	USP <71> / EP 2.6.1
Pseudomonas aeruginosa	9027	Growth at surface	USP <71> / EP 2.6.1
Bacillus subtilis	6633	Growth at surface / throughout	USP <71> / EP 2.6.1
Candida albicans	10231	Growth throughout (at 20–25 °C)	USP <71>
Aspergillus brasiliensis	16404	Surface growth / pellicle (at 20–25 °C)	USP <71>
Bacteroides fragilis	25285	Growth — lower zone (strict anaerobe)	Clinical reference
Clostridium perfringens	13124	Growth — lower zone (strict anaerobe)	FDA-BAM / EP

Storage & Stability

Dehydrated powder	10–30 °C, tightly sealed, dry, original container, protected from light and humidity
Shelf life (powder)	3 years from date of manufacture (as per labelled expiry)
Prepared broth	15–30 °C in sealed containers, use within 4 weeks
If refrigerated	2–8 °C — warm to room temperature before use
Discard prepared medium if	Pink >30%, contaminated, evaporated, turbid before inoculation, or precipitate present
Before use	If pink zone >30%, reheat in boiling water bath 4 min, cool rapidly. Do this once only — repeated heating degrades reducing agents.

Customs & Trade Information

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

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