

## LMX Broth, Modified (i23217)

Enrichment for the simultaneous detection of total coliforms and *E. coli* in water, food and dairy products by the fluorogenic procedure.

Industry: Water / Food

### Principles & Uses

Modified from the original description by MANAFI and KNEIFEL in 1989, the LMX Broth, further refined by MANAFI and OSSMER in 1993, has undergone alterations to optimize substrate utilization, enhance sensitivity, and streamline the overall incubation period to just 24 hours. This modified LMX Broth includes a phosphate buffer to ensure robust growth of total *coliforms*, and the presence of lauryl sulfate inhibits accompanying gram-positive flora. By introducing the chromogenic substrate 5-bromo-4-chloro-3-indolyl- $\beta$ -D-galactopyranoside and the fluorogenic substrate 4-methylumbelliferyl- $\beta$ -D-glucuronide, simultaneous detection of total *coliforms* and *E. coli* becomes feasible. A change in broth color from yellow to blue-green signifies the presence of *coliforms*, while blue fluorescence under long-wave UV light facilitates the rapid identification of *E. coli*. Tryptophan in the broth simplifies the indole reaction, with confirmation of *E. coli* presence through the formation of a red ring using Kovacs reagent. The addition of 1-isopropyl- $\beta$ -D-1-thio-galactopyranoside amplifies enzyme synthesis, heightening  $\beta$ -D-galactopyranoside activity.

### Composition (gr/L)

Tryptose 5, Sodium Chloride 5, Sorbitol 1, Tryptophan 1, Dipotassium hydrogen phosphate 2.7, Potassium dihydrogen phosphate 2, Lauryl sulfate sodium salt 0.1, X-GAL 0.08, MUG 0.05, IPTG 0.1.

Final pH at 25°C 6.8  $\pm$  0.2

### Preparation from dehydrated Powder

**Water testing:** If 100 ml water samples (e.g., drinking water) are to be tested, suspend 34 g (double strength)

in 1 Liter of purified water. Heat to boiling to dissolve completely. Transfer 100 ml aliquots into bottles (250 ml capacity). Autoclave for 15 min at 121°C. The prepared broth is clear and yellowish-brown.

### Quality Control

Dehydrated Appearance: Cream to light yellow, homogeneous, free-flowing.

Prepared Appearance: Cream to light yellow.

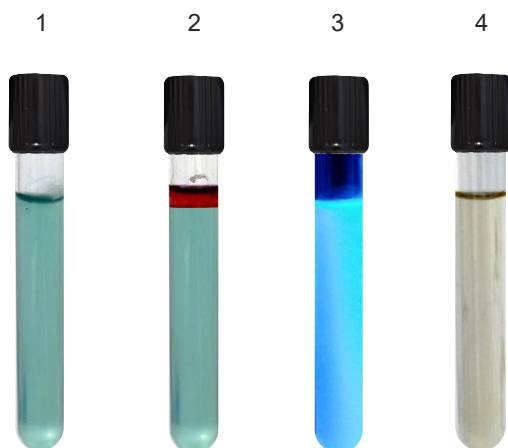
Reaction of 1.17% Solution at 25°C: pH 6.8  $\pm$  0.2.

### Cultural Response

Cultural response was observed after 18-48 hours of incubation at 35  $\pm$  0.5°C.

Organism (ATCC*)	Color Change to Blue-Green	Fluorescence	Indole
<i>Escherichia coli</i> (25922)	+	+	+
<i>Shigella flexneri</i> (12022)	-	-	-
<i>Enterobacter aerogenes</i> (13048)	+	-	-
<i>Salmonella typhimurium</i> (14028)	-	-	-
<i>Citrobacter freundii</i> (8090)	+	-	-

\*ATCC is a registered trade mark of the American Type Culture Collection.



The transition to a blue-green hue (1) signals the presence of both *E. coli* and coliforms, whereas the formation of a red ring due to indole production (2) and fluorescence under UV light (3) serve as confirmatory markers for *E. coli*. Additionally, turbidity resulting from growth (4) is indicative of microbial activity.

### Storage

Store dehydrated medium and prepared medium at 2-8 °C.