

# Tryptone Glucose Extract Agar • m TGE Broth

## Intended Use

Tryptone Glucose Extract Agar is used for cultivating and enumerating microorganisms in water and dairy products.

m TGE Broth, also known as membrane Tryptone Glucose Extract Broth, is used for enumerating microorganisms by membrane filtration.

## Summary and Explanation

In the 1930s, Bower and Hucker<sup>1</sup> developed a medium for detecting bacteria in milk and other dairy products. Many investigators compared the performance of Tryptone Glucose Skim Milk Agar to Nutrient Agar for estimating bacteria in milk and other dairy products.<sup>2-4</sup> Prickett<sup>5</sup> used a glucose agar containing tryptone to study thermophilic bacteria in milk. This medium, described in *Standard Methods of Milk Analysis*,<sup>6</sup> was prepared in the dehydrated form as Yeast Dextrose Agar. The American Public Health Association (APHA) adopted Tryptone Glucose Extract Agar for use in testing milk and dairy products in 1948.<sup>7</sup> For many years, Tryptone Glucose Extract Agar with added milk remained the standard methods medium for dairy products<sup>8</sup> and was also adopted for testing water.<sup>9</sup> It is currently recommended in the *Compendium of Methods for the Microbiological Examination of Foods* for performing the heterotrophic plate count procedure in testing bottled water.<sup>10</sup>

m TGE Broth is a nonselective nutrient medium for the determination of bacterial counts by the membrane filter method. The broth has the same formulation as the agar except that the broth contains no agar and the ingredients are at twice the concentration.

## Principles of the Procedure

Nutrients, including amino acids, carbon compounds, carbohydrates, minerals and trace substances, are supplied by the tryptone, beef extract and dextrose. Agar is the solidifying agent in Tryptone Glucose Extract Agar.

## Formulae

### Difco™ Tryptone Glucose Extract Agar

Approximate Formula* Per Liter	
Beef Extract.....	3.0 g
Tryptone .....	5.0 g
Dextrose (Glucose) .....	1.0 g
Agar .....	15.0 g

### Difco™ m TGE Broth

Approximate Formula* Per Liter	
Beef Extract.....	6.0 g
Tryptone .....	10.0 g
Dextrose (Glucose) .....	2.0 g

\*Adjusted and/or supplemented as required to meet performance criteria.

## Directions for Preparation from Dehydrated Product

1. Suspend/dissolve the powder in 1 L of purified water:  
Difco™ Tryptone Glucose Extract Agar – 24 g;  
Difco™ m TGE Broth – 18 g.  
Mix thoroughly.
2. For agar, heat with frequent agitation and boil for 1 minute to completely dissolve the powder.
3. Autoclave at 121°C for 15 minutes.
4. Test samples of the finished product for performance using stable, typical control cultures.

## Procedure

Consult the reference for information regarding the processing and inoculation of bottled water samples.<sup>10</sup>

### Agar (Pour Plate)

Usually 1 mL samples of appropriate dilutions of the test sample are pipetted into sterile Petri dishes and molten, cooled Tryptone Glucose Extract Agar is added followed by gentle mixing to distribute the sample dilution throughout the agar. Incubate hardened plates at 32 ± 1°C for 47-49 hours, or as specified in standard methods (35 ± 0.5°C for at least 72 hours).<sup>10</sup>

### Broth (Membrane Filtration)

Inoculate medium using the membrane filter technique and incubate at 35 ± 2°C for 18-24 hours in a humid atmosphere.

## Expected Results

Follow recommended procedures for counting colonies and reporting results.<sup>10</sup>

Because bacteria found in bottled water demonstrate a prolonged lag phase during adaptation to growth on Tryptone Glucose Extract Agar, extended incubation beyond 48 hours may be required.<sup>10</sup>

## References

1. Bowers and Hucker. 1935. Tech. Bull. 228. New York State Agr. Exp. Sta., Geneva, N.Y.
2. Yale. 1938. Am. J. Pub. Health 28:148.
3. Proc. 36th Cong. Intern. Assoc. Ice Cream Manufacturers. 1936. 2:132.
4. Dennis and Weiser. 1937. J. Dairy Science 20:445.
5. Prickett. 1928. Tech. Bull. 147. New York State Agr. Exp. Sta., Geneva, N.Y.
6. Standard Methods of Milk Analysis, 6th ed. 1934.
7. American Public Health Association. 1948. Standard methods for the examination of dairy products, 9th ed. American Public Health Association, New York, N.Y.
8. American Public Health Association. 1972. Standard methods for the examination of dairy products, 13th ed. American Public Health Association, Washington, D.C.
9. American Public Health Association. 1980. Standard methods for the examination of water and wastewater, 15th ed. American Public Health Association, Washington, D.C.
10. Kim and Feng. 2001. In Downes and Ito (ed.), Compendium of methods for the microbiological examination of foods, 4th ed. American Public Health Association, Washington, D.C.

## User Quality Control

### Identity Specifications

#### Difco™ Tryptone Glucose Extract Agar

Dehydrated Appearance: Light to medium tan, free-flowing, homogeneous.

Solution: 2.4% solution, soluble in purified water upon boiling. Solution is light amber, clear to slightly opalescent.

Prepared Appearance: Light amber, clear to slightly opalescent.

Reaction of 2.4%  
Solution at 25°C: pH 7.0 ± 0.2

#### Difco™ m TGE Broth

Dehydrated Appearance: Light tan, free-flowing, homogeneous.

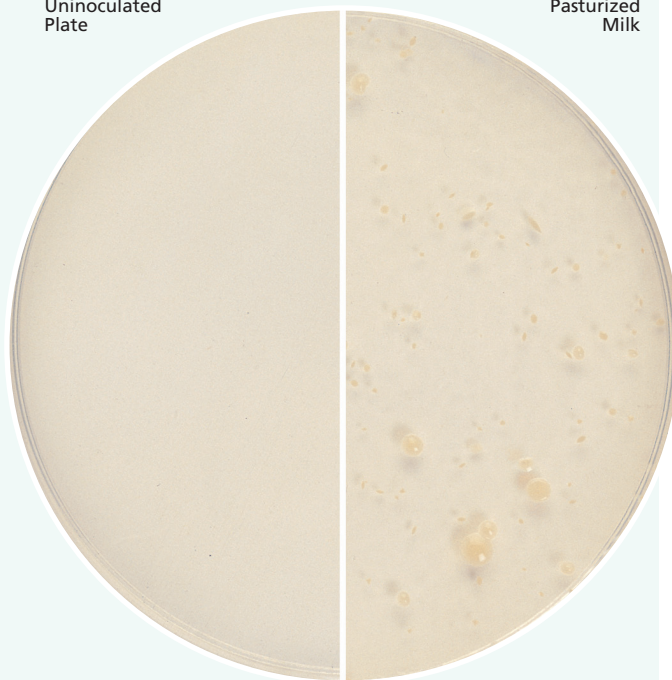
Solution: 1.8% solution, soluble in purified water. Solution is light to medium amber, clear to very slightly opalescent.

Prepared Appearance: Medium amber, clear to very slightly opalescent.

Reaction of 1.8%  
Solution at 25°C: pH 7.0 ± 0.2

Uninoculated  
Plate

Pasturized  
Milk



### Cultural Response

#### Difco™ Tryptone Glucose Extract Agar

Prepare the medium per label directions in parallel with a control (approved) lot of medium. Inoculate with serial dilutions of pasteurized and raw milk samples using the pour plate technique and incubate at 32 ± 1°C for 47-49 hours. Recovery of bacteria from the milk samples should be comparable for both the test and control lots.

#### Difco™ m TGE Broth

Prepare the medium per label directions. Inoculate using the membrane filter technique and incubate at 35 ± 2°C for 18-24 hours in a humid atmosphere.

ORGANISM	ATCC™	INOCULUM CFU	RECOVERY
<i>Escherichia coli</i>	25922	30-300	Good
<i>Staphylococcus aureus</i>	25923	30-300	Good

## Availability

### Difco™ Tryptone Glucose Extract Agar

AOAC COMPF

Cat. No. 223000 Dehydrated – 500 g

Japan

Cat. No. 252127 Prepared Plates – Pkg. of 20\*

Mexico

Cat. No. 252740 Prepared Plates (60 × 15 mm-style) – Pkg. of 20\*

### Difco™ m TGE Broth

Cat. No. 275010 Dehydrated – 100 g

275020 Dehydrated – 500 g

\*Store at 2-8° C.