Chapman Stone Medium

Intended Use

Chapman Stone Medium is used for isolating and differentiating staphylococci based on mannitol fermentation and gelatinase activity.

Summary and Explanation

Chapman Stone Medium is prepared according to the formula described by Chapman.[1] It is similar to Staphylococcus Medium 110, previously described by Chapman,[2] except that the sodium chloride concentration is reduced to 5.5% and ammonium sulfate is included in the formulation. The inclusion of ammonium sulfate in the medium negates the need to add a reagent after growth has been obtained in order to detect gelatinase activity by Stone's method. Chapman Stone Medium is especially recommended for suspected food poisoning studies involving *Staphylococcus*.[3] It is selective, due to the relatively high salt content, and is differential due to pigmentation, mannitol fermentation and the presence or absence of gelatin liquefaction.

Principles of the Procedure

Yeast extract and peptone provide nitrogen, carbon, sulfur, vitamins and trace nutrients essential for growth. Gelatin serves as a substrate for gelatinase activity. Ammonium sulfate allows detection of gelatin hydrolysis. D-Mannitol is the fermentable carbohydrate. Sodium chloride acts as a selective agent because most bacterial species are inhibited by the high salt content. Dipotassium phosphate provides buffering capability. Agar is the solidifying agent.

Formula

Difco™ Chapman Stone Medium

Approximate Formula* Per Liter		
Yeast Extract	2.5	g
Pancreatic Digest of Casein	10.0	g
Gelatin	30.0	g
D-Mannitol	10.0	g
Sodium Chloride	55.0	g
Ammonium Sulfate	75.0	g
Dipotassium Phosphate	5.0	g
Agar	15.0	g

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

Directions for Preparation from Dehydrated Product

1. Suspend 20.2 g of the powder in 100 mL of purified water. Mix thoroughly.
2. Heat with frequent agitation and boil for 1 minute to completely dissolve the powder.
3. Autoclave at 121°C for 10 minutes. Omit autoclaving if used within 12 hours.
4. Test samples of the finished product for performance using stable, typical control cultures.

User Quality Control

Identity Specifications

Difco™ Chapman Stone Medium

Dehydrated Appearance:	Light beige, free-flowing, homogeneous with a tendency to cake.
Solution:	20.2% solution, soluble in purified water upon boiling. Solution is light amber, opalescent with a precipitate.
Prepared Appearance:	Light to medium amber, opalescent with a precipitate.
Reaction of 20.2% Solution at 25°C:	pH 7.0 ± 0.2

Cultural Response

Difco™ Chapman Stone Medium

Prepare the medium per label directions. Inoculate and incubate at 30 ± 2°C for 18-48 hours. Add bromcresol purple indicator to determine mannitol fermentation (yellow = positive).

ORGANISM	ATCC™	INOCULUM CFU	RECOVERY	HALO (GELATINASE)	MANNITOL FERMENTATION
Escherichia coli	25922	10^2-10^3	Inhibition	–	–
Staphylococcus aureus	25923	10^2-10^3	Good	+	+
Staphylococcus epidermidis	12228	10^2-10^3	Good	+	–

Procedure

1. Streak a sample of the specimen onto the surface of the agar. Make several stabs into the medium along the streak.
2. Incubate, aerobically, at 30 ± 2°C for up to 48 hours.
3. Examine for growth and the presence or absence of clear zones around colonies.
4. To determine mannitol fermentation, add a few drops of bromcresol purple to areas on the medium from which colonies have been removed. Any change in color of the indicator, compared with that of the uninoculated medium, indicates fermentation of mannitol.

Expected Results

Mannitol fermentation: Positive = change in color of the indicator to yellow.

Gelatinase activity: Positive Stone reaction = formation of clear zones around the colonies.

Any mannitol-positive, yellow or orange colonies surrounded by a clear zone are presumptively identified as *Staphylococcus aureus*. White or nonpigmented colonies, with or without a clear zone, are probably *S. epidermidis*.

Limitations of the Procedure

1. Confirm the presumptive identification of pathogenic staphylococci with additional tests, such as coagulase activity.
2. Enterococci and/or Group D streptococci may exhibit growth on the medium and show slight mannitol fermentation. The colonies, however, are tiny and can easily be differentiated from staphylococci by Gram stain and the catalase test.[3]

References

1. Chapman. 1948. Food Res. *13*:100.
2. Chapman. 1946. J. Bacteriol. *51*:409.
3. MacFaddin. 1985. Media for isolation-cultivation-identification-maintenance of medical bacteria. Williams & Wilkins, Baltimore, Md.

Availability

Difco™ Chapman Stone Medium

Cat. No. 211805 Dehydrated – 500 g