VJ Agar (Vogel and Johnson Agar)

Intended Use

VJ Agar, also known as Vogel and Johnson Agar, is used for the early detection of coagulase-positive, mannitol-fermenting staphylococci.

Summary and Explanation

In 1955, Zebovitz et al. developed Tellurite-Glycine Agar as a selective plating medium for the quantitative detection of coagulase-positive staphylococci.[1] This medium was modified by Vogel and Johnson in 1960 by the addition of phenol red as a pH indicator and by increasing the mannitol content.[2] VJ Agar selects and differentiates the coagulase-positive staphylococci which ferment mannitol and reduce tellurite.[3]

VJ Agar is specified as a standard methods medium for cosmetics,[4,5] pharmaceutical articles[6] and nutritional supplements.[6]

Principles of the Procedure

Peptone is a source of carbon, nitrogen, vitamins and minerals. Yeast extract supplies B-complex vitamins which stimulate bacterial growth. Mannitol is the carbohydrate. Inhibition of nonstaphylococcal organisms is achieved by the potassium tellurite additive, which is inhibitory for some species of both gram-positive and gram-negative bacteria, by lithium chloride and by the high glycine content. Staphylococci may be slightly inhibited by the presence of the three inhibitors; however, this is compensated for by the addition of mannitol and glycine.[3] Phenol red is the pH indicator and agar is the solidifying agent.

Coagulase-positive staphylococci reduce the potassium tellurite to metallic free tellurium, producing colonies that are gray-black. The fermentation of mannitol by coagulase-positive staphylococci is detected by a change in the color of the phenol red indicator from red (alkaline) to yellow (acid).

Prepared plates of Vogel and Johnson Agar contain 0.2 g/L of potassium tellurite.

Formula

Difco™ VJ Agar

Approximate Formula* Per Liter		
Tryptone	10.0	g
Yeast Extract	5.0	g
Mannitol	10.0	g
Dipostassium Phosphate	5.0	g
Lithium Chloride	5.0	g
Glycine	10.0	g
Agar	15.0	g
Phenol Red	25.0	mg

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

User Quality Control

Identity Specifications

Difco™ VJ Agar

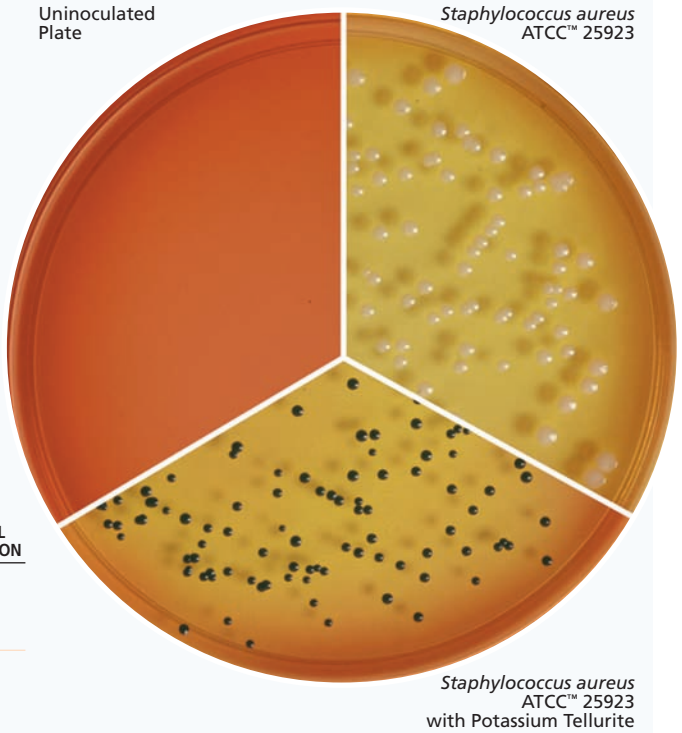
Dehydrated Appearance:	Pink, free-flowing, homogeneous.
Solution:	6.0% solution, soluble in purified water upon boiling. Solution is red, very slightly to slightly opalescent, may have a slight white precipitate.
Prepared Appearance:	Red, slightly opalescent, may have a slight white precipitate.
Reaction of 6.0% Solution at 25°C:	pH 7.2 ± 0.2

Cultural Response

Difco™ VJ Agar

Prepare the medium per label directions. Inoculate and incubate at 35 ± 2°C for 18-48 hours.

ORGANISM	ATCC™	INOCULUM CFU	RECOVERY	TELLURITE REDUCTION	MANNITOL FERMENTATION
Escherichia coli	25922	3 10^2-10^3	Marked to complete inhibition	– (translucent)	– (red)
Proteus mirabilis	25933	3 10^2-10^3	Partial to complete inhibition	+ (black)	– (red)
Staphylococcus aureus	25923	10^2-3 10^2	Good	+ (black)	+ (yellow)
Staphylococcus epidermidis	12228	3 10^2-10^3	Fair to good	± (translucent to black)	– (red)



Directions for Preparation from Dehydrated Product

1. Suspend 60 g of the powder in 1 L 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 15 minutes. Cool to 45-50°C.
4. Add 20 mL of sterile Tellurite Solution 1%. Mix well.
5. Test samples of the finished product for performance using stable, typical control cultures.

Procedure

Use standard procedures to obtain isolated colonies from specimens. Incubate plates for 18-48 hours at 35 ± 2°C in an aerobic atmosphere.

Expected Results

After incubation, examine the isolated colonies on the plated medium. During the first 18-24 hours of incubation, most organisms, other than coagulase-positive staphylococci, are totally or markedly inhibited. By 48 hours, many coagulase-negative, mannitol-fermenting or coagulase-negative, mannitol-negative staphylococci will appear on the medium.

The coagulase-positive cocci form small, black colonies on red plates. If mannitol is fermented, the colonies are surrounded by yellow zones due to the color change of the phenol red indicator in response to the acid formation. If mannitol has not been fermented, no yellow zone is present, and the color of the medium around the colonies may even be a deeper red than normal due to utilization of the peptones in the medium.

References

1. Zebovitz, Evans and Niven. 1955. J. Bacteriol. *70*:686.
2. Vogel and Johnson. 1960. Public Health Lab. *18*:131.
3. MacFaddin. 1985. Media for isolation-cultivation-identification-maintenance of medical bacteria, vol. 1. Williams & Wilkins, Baltimore, Md.
4. Hitchins, Tran and McCarron. 2001. *In* FDA bacteriological analytical manual, online. AOAC International, Gaithersburg, Md.
5. Curry, Graf and McEwen (ed.). 1993. CTFA microbiology guidelines. The Cosmetic, Toiletry, and Fragrance Association, Washington, D.C.
6. United States Pharmacopeial Convention, Inc. 2008. The United States pharmacopeia 31/The national formulary 26, Supp. 1, 8-1-08, online. United States Pharmacopeial Convention, Inc., Rockville, Md.

Availability

Difco™ VJ Agar

BAM

Cat. No. 256220 Dehydrated – 500 g

BBL™ Vogel and Johnson Agar

BAM

Cat. No. 298220 Prepared Plates – Pkg. of 10*

BBL™ Tellurite Solution 1%

Cat. No. 211917 Tube – 20 mL*

**Store at 2-8°C.*