Simmons Citrate Agar (i23171)

For the differentiation of Gram-negative bacteria on the basis of citrate utilization. Bacteria that can utilize citrate as sole carbon source turn the medium blue.

Industry: Food / Clinical / Water

Principles & Uses

Simmons Citrate Agar is employed for the differentiation of Gram-negative enteric *bacilli* based on their ability to utilize sodium citrate as a sole carbon source and inorganic ammonium salt as a nitrogen source. This medium aids in distinguishing *coliforms* isolated from both water and clinical specimens. Sodium chloride helps maintain osmotic balance, while dipotassium phosphate serves as a buffering system. The pH indicator, bromothymol blue, changes from green to blue, indicating alkalinization when an organism metabolizes citrate. Only organisms capable of citrate utilization exhibit this color change, while non-utilizing organisms remain green. *Escherichia coli*, *Shigella*, Yersinia, and *Edwardsiella* species do not grow on this medium. Many other species, such as *Serratia*, *Enterobacter*, *Citrobacter*, *Klebsiella*, *Proteus*, and *Providencia* (except for *Morganella morganii* and *Klebsiella rhinoscleromatis*), utilize citrate and turn the medium blue. Furthermore, it assists in distinguishing citrate-positive *Salmonella* species from citrate-negative ones. ISO 10273 recommends this medium for confirming *Yersinia* enterocolitica, which does not use citrate as a sole carbon source, thus maintaining a green color.

Composition (gr/L)

Sodium Chloride 5, Sodium Citrate 2, Dipotassium Hydrogen Phosphate 1, Ammonium Dihydrogen Phosphate 1, Magnesium Sulfate·$7H_2O$ 0.2, Bromothymol Blue 0.08, Agar 13.

Final pH at 25°C 6.6 ± 0.2

Preparation from dehydrated Powder

Suspend 22.3 g of the powder in 1 Liter of purified water. Mix thoroughly. Dispense and autoclave at 121°C for 15 minutes. Allow to cool in a slanted position for use as slants. The agar also may be used as a plating medium.

Quality Control

Dehydrated Appearance: Light orange free-flowing, homogeneous may contain many dark and gray flecks.

Prepared Appearance: Medium to dark, green, clear to slightly hazy, with a small amount of precipitate and as many as a large amount of insoluble.

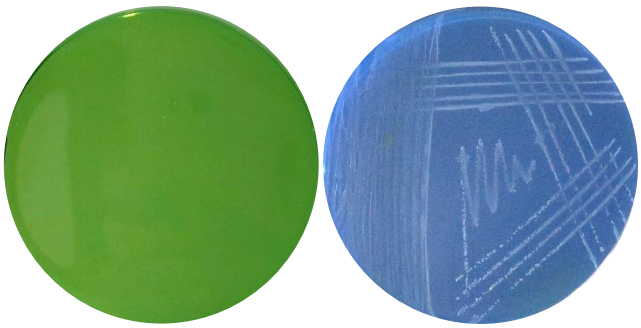
Reaction of 2.23% Solution at 25°C: pH 6.6 ± 0.2

Cultural Response

Inoculate with fresh cultures and incubate aerobically at 35 ± 2°C for 24-48 hours.

Organism (ATCC*)	Recovery	Color change to blue
Escherichia coli (25922)	None/poor	-
Enterobacter cloacae (13047)	Good	Alkaline (blue)
Citrobacter freundii (9080)	Good	Alkaline (blue)
Shigella flexneri (12022)	None/poor	-

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



Prepared culture medium with a green color (left). *Citrobacter freundii* causes the medium to turn blue

Storage

Keep the container at 15-30 °C. Store prepared medium at 2-8 °C.