85463 Simmons Citrate Agar
NutriSelect® Basic

For differentiating between fecal coli and members of the aerogenes group based on citrate utilization. Also, for the identification of certain fungi and fungi imperfecti.

Composition:

Ingredients	Grams/Litre
Magnesium sulphate heptahydrate	0.2
Ammonium dihydrogen phosphate	0.2
Disodium ammonium phosphate	0.8
Trisodium citrate	2.0
Sodium chloride	5.0
Bromothymol blue	0.08
Agar	15.0

Final pH 7.0 +/- 0.2 at 25°C

Store dehydrated powder below 30°C in a tightly closed container and the prepared medium at 2-8°C. Use before expiry date on the label.

Appearance(color):	Light green & light yellow & light beige, free flowing powder
Gelling:	Firm, comparable with 1.5% Agar gel
Color and Clarity:	Forest green coloured clear to slightly opalescent gel forms in tubes as slants

Directions:
Suspend 23.3 g in 1 litre distilled water and heat to boiling to dissolve. Distribute in tubes or flasks and sterilize by autoclaving at 121°C for 15 minutes. Allow tubes to cool as slants.

Principle and Interpretation:
Simmons Citrate agar is used to test an organism's ability to utilize citrate as a source of energy. These media are used for the differentiation between Enterobacteriaceae and the members of aerogenes group. Initially the citrate medium was developed by Koser in early 1920s (1) containing ammonium salt as the only nitrogen source and citrate as the only carbon source for differentiating Escherichia coli and Enterobacter aerogenes by IMViC tests. Later on Simmons (2) modified Kosers formulation by adding agar and bromo thymol blue (3). It is recommended by APHA (4).
Ammonium dihydrogen phosphate and sodium citrate serve as the sole nitrogen and carbon source respectively. Sodium chloride maintains the osmotic balance of the medium. Magnesium sulfate is a cofactor for a variety of metabolic reactions. Microorganisms also use inorganic ammonium salts as their sole nitrogen source. Metabolism of these salts causes the medium to become alkaline, indicated by a change in colour of the pH indicator from green to blue. Bromothymol blue is the pH indicator. The medium should be freshly prepared because in dry conditions, changes in colour may appear even before inoculation, especially at the bottom of the slant.

Cultural characteristics observed after an incubation for 18-24 hrs at 35-37°C with added 0.2% solution of sodium citrate

Organisms (ATCC/WDCM)	Inoculum (CFU)	Growth	Citrate utilization
Enterobacter aerogenes (13048/-)	50-100	++/+++	positive reaction, blue color
*Escherichia coli (*25922/-)	≥10^3	-	negative reaction, green color
Salmonella Typhimurium (14028/-)	50-100	++/+++	positive reaction, blue color
Salmonella Typhi (6539/-)	50-100	+/++	negative reaction, green color
Shigella dysenteriae (13313/-)	≥10^3	-	negative reaction, green color
Salmonella Enteritidis (13076/-)	50-100	++/+++	positive reaction, blue color

References:

1. Koser, 1923, J. Bact., 8:493.
2. Simmons, 1926, J. Infect. Dis., 39:209.
3. MacFaddin J., 1985, Media for Isolation-Cultivation-Identification-Maintenance of Medical Bacteria, Vol. 1, Williams and Wilkins, Baltimore.
4. Eaton A. D., Clesceri L. S., Rice E. W., and Greenberg A W., (Eds.), 2005, Standard Methods for the Examination of Water and Wastewater, 21st Ed., APHA, Washington, D.C.

Precautions and Disclaimer

This product is for R&D use only, not for drug, household, or other uses. Please consult the Material Safety Data Sheet for information regarding hazards and safe handling practices.