SIMMONS CITRATE AGAR

SCAG-00P-500

- **Principle**

Simmons Citrate Agar is a modification of Koser's citrate medium (1923) and is used for the differentiation of enteric bacteria based on their ability to utilise citrate as the sole carbon source. The formulation contains sodium citrate as the only carbon source and ammonium dihydrogen phosphate as the sole nitrogen source, creating a defined medium that supports growth only of organisms capable of metabolising these compounds.

Magnesium sulphate provides essential ions acting as cofactors in metabolic reactions, while dipotassium phosphate functions as a buffering agent to maintain pH stability. Sodium chloride maintains osmotic balance. Bromothymol blue is incorporated as a pH indicator, and agar serves as the solidifying agent.

Organisms that possess citrate permease can transport and metabolise citrate, converting it into pyruvate and other intermediates for energy production. During this process, utilisation of ammonium salts leads to the production of ammonia and other alkaline by-products, increasing the pH of the medium. As the pH rises above approximately 7.6, bromothymol blue changes from green to blue, indicating a positive citrate reaction. Simmons Citrate Agar is recommended by standard methods, including APHA and BIS, for the differentiation of Enterobacterales.

- **Regulatory compliance**

This product is manufactured under a quality management system in accordance with ISO 9001 and ISO 13485, and its formulation and quality control comply with applicable international standards, such as ISO 11133, where relevant.

- **Composition**

Ingredients	**g/L**
Magnesium Sulphate	0.20
Ammonium Dihydrogen Phosphate	1.00
Dipotassium Phosphate	1.00
Sodium Citrate	2.00
Sodium Chloride	5.00
Bromothymol Blue	0.08
Agar	15.00

- **Preparation**

Dissolve 24.28 grams in 1,000 ml distilled water. Boil to dissolve the medium completely and sterilize by autoclaving at 15 lbs. pressure (121°C) for 15 min, cool it to 42-45 °C and distribute aseptically in test tubes. Slant the tubes to have a small butt and slant, allow to solidify. Ensure complete solidification and inoculate test sample aseptically.

- **Applications and use**

Recommended for the differentiation of members of the Enterobacterales based on citrate utilisation, particularly as part of routine biochemical identification schemes following primary isolation on selective enteric media such as MacConkey Agar (AGMC-IEP-500).

- **Quality control**

Solubility	w/o rests
Appearance	Fine powder
Colour of the dehydrated medium	Light yellow
Colour of the prepared medium	Dark green
Final pH (25 °C)	6.8 ± 0.2

- **Microbiological test**

Cultural characteristics observed after incubation at 35±2 °C for 18-24 hours. Inoculum 50-100 CFU.

Microorganism	ATCC	Growth	Colour of medium around the colonies	Citrate utilization
Escherichia coli	8.739	Poor	No colour changes due to growth inhibition	Negative
Salmonella typhimurium	14.028	Good	Blue colour formed	Positive
Salmonella enteritidis	13.076	Good	Blue colour formed	Positive
Klebsiella aerogenes	13.048	Good	Blue colour formed	Positive

- **Storage**

The product is highly hygroscopic; keep the container always closed and store it properly as per the conditions mentioned on the label. The declared expiry is valid only when stored as per the conditions mentioned on the label. Temp. Min.:2 °C Temp. Max.:25 °C.

Note: Sterilize media immediately after reconstitution.

- **Bibliography**

American Public Health Association, 1981, Standard Methods for the Examination of Water and Wastewater, 15th ed., APHA Inc., Washington, D.C.

Atlas, R. M. (2005). Handbook of media for environmental microbiology. CRC press.

Bureau of Indian Standards, IS:5887 (Part II) 1976, reaffirmed 1986

Difco Manual (1998). 11th Edition. Difco Laboratories., Division of Becton Dickinson and Company, Sparks, Maryland, USA.

MacFaddin J., (1985), Media for Isolation-Cultivation-Identification-Maintenance of Medical Bacteria, Vol. 1, Williams and Wilkins, Baltimore.

- **Product use limitation**

This product is developed, designed and supplied exclusively for research use only. It is not intended for diagnostic applications or drug development, and it is not suitable for administration to humans or animals.