Campylobacter Selective Supplement (Preston)

PRODUCT INFORMATION

P007-1MU - Polymyxin B Sulfate, Powder, 1MU

P007-10MU - Polymyxin B Sulfate, Powder, 10MU

P007-100MU - Polymyxin B Sulfate, Powder, 100MU

R003-1g - Rifampicin, Powder, 1g

R003-5g - Rifampicin, Powder, 5g

T011-5g - Trimethoprim, Powder, 5g

T011-25g - Trimethoprim, Powder, 25g

T011-100g - Trimethoprim, Powder, 100g

C001-1g - Cycloheximid, Powder, 1g

C001-5g - Cycloheximid, Powder, 5g

DESCRIPTION

Campylobacter Agar Base with Campylobacter Selective Supplement (Preston) is a selective medium for the selective isolation of *Campylobacter jejuni* and *C. coli* from human, animal, avian and environmental specimens.

BACKGROUND

Polymyxin B is an antibiotic primarily used for resistant gram-negative infections. It is derived from the bacterium *Bacillus polymyxa.* Polymyxin B is a mixture of two closely related compounds, polymyxin B1 and polymyxin B2. It has a bactericidal action against almost all gram-negative bacilli except the Proteus group.

Rifampicin is a bactericidal antibiotic drug of the rifamycin group. It is a semisynthetic compound derived from *Amycolatopsis rifamycinica* (formerly known as *Amycolatopsis mediterranei* and *Streptomyces mediterranei*).

Trimethoprim is a bacteriostatic antibiotic which belongs to the class of chemotherapeutic agents known as dihydrofolate reductase inhibitors.

Cycloheximide is widely used in biomedical research to inhibit protein synthesis in eukaryotic cells studied in vitro (i.e. outside of organisms). Its effects are rapidly reversed by simply removing it from the culture medium.

Mechanism of action

Polymyxins bind to the cell membrane and alter its structure, making it more permeable. The resulting water uptake leads to cell death.

Rifampicin inhibits DNA-dependent RNA polymerase in bacterial cells by binding its beta-subunit, thus preventing transcription to RNA and subsequent translation to proteins. Its lipophilic nature makes it a good candidate to treat the meningitis form of tuberculosis, which requires distribution to the central nervous system and penetration through the blood-brain barrier.

Trimethoprim acts by interfering with the action of bacterial dihydrofolate reductase, inhibiting synthesis of tetrahydrofolic acid. Tetrahydrofolic acid is an essential precursor in the de novo synthesis of the intermediate Thymidine monophosphate (dTMP), precursor of DNA metabolite Thymidine triphosphate. Bacteria are unable to take up folic acid from the environment (i.e. the infection host) and are thus dependent on their own de novo synthesis. Inhibition of the enzyme starves the bacteria of nucleotides necessary for DNA replication causing, in certain circumstances, cell lethality due to thymineless death.

Cycloheximide is an inhibitor of protein biosynthesis in eukaryotic organisms, produced by the bacterium Streptomyces griseus. Cycloheximide exerts its effect by interfering with the translocation step in protein synthesis (movement of two tRNA molecules and mRNA in relation to the ribosome) thus blocking translational elongation.

APPLICATION IN CAMPYLOBACTER AGAR BASE

The Preston campylobacter selective agar is based on the formulation described by Bolton and Robertson. This medium was specifically formulated to be suitable for isolation of *Campylobacter* species from all types of specimens (human, animal, avian and environmental).

In comparative studies of the selective media of Skirrow, Butzler, Blaser, Campy-BAP and Preston, the Preston

medium was found to give the maximum isolation rate of *Campylobacter* species from all types of specimens tested and also to be the most selective.

Toku-e campylobacter agar base has been prepared from materials described by Bolton and Robertson. It is suitable as a basal medium for the selective supplements of Blaser-Wang, Skirrow and Butzler.

Content concentrations

Typical Formula*	mg/litre
Campylobacter Agar Base	
`Lab-Lemco' powder	10
Peptone	10
Sodium chloride	5
Agar	12
Final pH 7.5 ± 0.2 @ 25°C	
Campylobacter Selective Supplement (Preston)	
Polymyxin B	5,000 IU
Rifampicin	10.0
Trimethoprim	10.0
Cycloheximide	100.0
* Adjusted as required to meet performance standards	

Table 1 typical formula for Campylobacter Agar Base and Campylobacter Selective Supplement (Preston)

METHOD

Preparation

Suspend appropriate amount of campylobacter agar base in distilled water and bring to the boil to dissolve completely. Sterilise by autoclaving at 121°C for 15 minutes. Cool to 50°C. Aseptically add 25ml of lysed horse blood, and supplements reconstituted as directed and appropriate amount of campylobacter growth supplement. Mix well and pour into sterile Petri dishes.

Protocol

Direct Selective Plating Method:

1. Prepare the campylobacter selective agar as directed.

2. Emulsify the specimen under test in 2 ml of 0.1% peptone water.

3. Inoculate onto the selective medium with cotton tipped swabs so that single isolated colonies are formed.

4. Incubate the plates in an atmosphere consisting of approximately 5-6% oxygen, 10% carbon dioxide and 84-85% nitrogen for 24-48 hours (When few Campylobacter colony forming units are present 48 hours incubation is necessary.) at 42°C.

5. Examine the plates and confirm the typical colonies as *Campylobacter jejuni* or *Campylobacter coli* by the standard methods.

Selective Enrichment Broth Technique:

1. Prepare the selective enrichment broth as directed.

2. Emulsify the specimen under test in the selective enrichment broth.

3. Incubate the broth aerobically at 42°C for 24 hours.

4. Subculture on to Preston Campylobacter Selective Agar or Campylobacter Blood-Free Selective Agar.

Quality control

Positive control:

Campylobacter jejuni ATCC® 29428: Good growth; grey-brown coloured colonies

Negative control:

Escherichia coli ATCC® 25922: Inhibited

REFERENCES

1. Bolton F.J. and Robertson L. (1982) J. Clin. Pathol. 35. 462-467.

2. Bolton F.J., Coates D., Hinchliffe P.M. and Robertson L. (1983) J. Clin. Pathol. 36. 78-83.

3. George H.A., Hoffman P.S., Kreig N.R. and Smibert R.M. (1979) Can. J. Microbiol. 25. 8-16.

4. Bolton F.J., Coates D. and Hutchinson D.N. (1984) J. Appl. Bact. 56. 151-157.

5. Rogol M., Schnaidman B., Katzenelso E. and Sechter I. (1990) Eur. J. Clin. Microbiol. Inf. Dis. 9. 760-762.